ny co

# Numeration.

Quintillions. Quadrillions. Trillions. Billions. Millions. &c.

913,208,000,341,000,07,291,356,809,379,120,406,019,768.

# Simple Addition.

Is the putting together of two or more Numbers, or Sums, to make them one total or whole Sum. Is the adding several integers or whole numbers together which are all of one kind or sort.

4 8 6 3 4 2 7 4 6 3 7 1 2 9 3 9 6 2 3 8 1 4 9 7

3 4 6 5 1 9 2 8 4 6 7 9 8 7 6 3 1 8 6 7 5 2 8

7 6 3 4 2 1 0 4 6 3 9 2 8 1 7 1 8 6 3 5 9 1 2 8

1 3 4 6 1 2 7 5 3 4 6 3 6 2 9 4 7 9 2 4 1 2 3 6

1 7 3 0 6 9 5 6 1 8 6 2 4 7 6 1 5 1 9 9 7 4 9 3 4

1 2 4 4 3 5 2 9 1 5 4 0 7 6 5 2 9 3 7 3 6 7 8 9 7

1 7 3 0 6 9 5 6 1 0 2 7 6 1 1 8 9 9 1 4 9 3 4

## Simple Subtraction

7 3 4 6 2 5 8

4 6 7 6 3 4

3 7 7 9 2 2 4

7 3 4 6 2 5 2

8 4 6 3 6 7 5 3

2 3 6 6 3 1 6 5

6 1 0 2 6 8 1 2

8 4 6 3 7 7 5 3

# Simple Multiplication

Is the multiplying any two numbers together, without having regard to their ſignification; as 7 times 8 is 56.

## Multiplication Table. Caſe the 1.

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 |
| 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 | 33 | 36 |
| 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40 | 44 | 48 |
| 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 |
| 6 | 12 | 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 | 66 | 72 |
| 7 | 44 | 21 | 28 | 35 | 42 | 49 | 56 | 63 | 70 | 77 | 84 |
| 8 | 16 | 24 | 32 | 40 | 48 | 56 | 64 | 72 | 80 | 88 | 96 |
| 9 | 18 | 27 | 36 | 45 | 54 | 63 | 64 | 81 | 90 | 99 | 108 |
| 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 |
| 11 | 22 | 33 | 44 | 55 | 66 | 77 | 88 | 99 | 100 | 121 | 132 |
| 12 | 24 | 36 | 48 | 60 | 72 | 84 | 96 | 108 | 120 | 132 | 144 |

When the multiplier is not more than 12, always placing the greater number uppermost, ſet the multiplier underneath, units under units &c and begin as the Table directs, ſetting down the unit figure under units, and carrying the tens to the next place in all reſpects as in ſimple addition.

### Caſe the 2.

When the multiplier conſiſts of more places than one, multiply each figure in the multiplicand by every figure in the multiplier, beginning with the units, & placing the firſt figure of each product exactly under its multiplier. Lastly add these ſeveral products together, in the order they ſtand, & their Sum will be their total product.

```
 763896.          3918295.
      5.                8.
 3819480         31346360.

 9164785         85834786
       9.              12.
82483065        1030017432.
```

| | |
|---|---|
| 48730892 | 37506463 |
| 486 | 26 |
| 291785352 | 225038778 |
| 389847136 | 75012926 |
| 194923568 | 975268038 |
| 23683213512 | |

## Caſe 3^th.

*When the multiplier is a composite number, that is, when it is produced by the multiplication of any two numbers in the Table, multiply the multiplicand by one of those figures, first, & that product by the other. And, the laſt product will be the total required.*

| (6 × 9 = 54) | (8 × 6 = 48) | 9 × 9 = 81. |
|---|---|---|
| 458160 | 39187. | 91738 |
| 2748960 | 333496 | 825642 |
| 24740640 | 2000976 | 7430778. |

## Caſe 4^the.

*When there are cyphers on the right hand of, either the multiplicand, or multiplier, or both, neglect those cyphers: then place the ſignificant figures underneath* (one another) *& multiply by them only; add them together, as before directed, and place to the right, as many cyphers, as in b[oth] factors.*

# Caſe the Second.

When there is one cypher, or more, at the right hand of the diviſor; it or they must be cut off; also cut off the same number of figures from the dividend, and then proceed as in case first; But the figures which were cut off from the dividend must be placed at the right hand of the remainder. ..................

```
917|0) 47650|3 (51 {      656|00) 735|49 (1
       4585                        656
       ----                        -------
        1008                        7949.
         917                743|000) 894|870 (1
        ----                         743
        8193                         -----
                                     15187.
```

# Caſe 4th.

Short diviſion is, when the diviſor does not exceed 12.

# Rule.

First, ſeek how often the diviſor can be had in the first figure, or figures of the dividend; which, when found, place in the quotient; then mentally, multiply your diviſor by the figure placed in the quotient, & subtract the product from the like number of the left hand figures of your dividend / and the units which remain must be accounted ſo many tens, which you must ſuppoſe to stan

at the left hand of the next figures of the dividend, & to be reckoned with it; then seek how often you can have your divisor in those two figures; but if nothing remain, you must then seek how often your divisor is containd in the next figure, or figures, & thus proceed till you have done. Dated 10th June.

5) 633795
126759

8) 5437846
679730 = 6

12) 119643784 7536
99703153 961 = 4

7) 193847
27692 = 3.

# Compound Addition.

Is the adding of several numbers together, having different denominations, as Pounds, Shillings, Pence &c. Tons, Hundreds, Quarters, &c. Rule. Place the numbers so that those of the same denomination may ſtand directly under each other.

| £ | S | D | Qr |
|---|---|---|---|
| 10 | 20 | 12 | 4 |
| 47 | 17 | 6 | 2 |
| 3 | 9 | 10 | 3 |
| 75 | 13 | 9 | 1 |
| 4 | 11 | 11 | 0 |
|  | 16 | 0 | 2 |
| 7 | 6 | 2 | 1 |
| 9 | 16 | 0 | 1 |
| 1 | 10 | 5 | 3 |
| 9 | 16 | 0 | 1. |

| £ | S | D | Qr |
|---|---|---|---|
| 9 | 16 | 10 |  |
| 7 | 10 | 9 |  |
| 0 | 10 | 6 |  |
| 5 | 11 | 11 |  |
| 6 | 0 | 0 |  |
| 5 | 9 | 10 |  |
| 35 | 0 | 6 |  |
| 25 | 11 | 0 |  |
| 35 | 0 | 6 |  |

| £ | S | D | Qr | | £ | S | D | Qr |
|---|---|---|---|---|---|---|---|---|
| 764 | 13 | 10 | 2 | | 915 | 10 | 10 | 2 |
| 43 | 9 | 8 | 1 | | 64 | 8 | 9 | 1 |
| 59 | 17 | 11 | 2 | | 5 | 16 | 11 | 3 |
| 817 | 16 | 9 | 3 | | 419 | 2 | 10 | 2 |
| 762 | 19 | 10 | 1 | | 491 | 19 | 11 | 3 |
| 419 | 17 | 6 | 2 | | 762 | 17 | 6 | 1 |
| 2868 | 15 | 8 | 3 | | 2659 | 17 | 0 | 0 |
| 2104 | 1 | 10 | 1 | | 1744 | 6 | 1 | 2 |
| 2868 | 15 | 8 | 3 | | 2659 | 17 | 0 | 0 |

## French Money.

| Cro. of Ex. | liv. | sols. | den. | | Cro. of ex. | liv. | sols | de. |
|---|---|---|---|---|---|---|---|---|
| 976 | 2 | 17 | 10 | | 567 | 5 | 13 | 11 |
| 379 | 1 | 12 | 6 | | 389 | 1 | 19 | 6 |
| 491 | 1 | 0 | 11 | | 548 | 4 | 17 | 10 |
| 592 | 2 | 15 | 0 | | 632 | 3 | 11 | 9 |
| 2440 | 2 | 6 | 11 | | 2141 | 1 | 3 | 0 |
| 1463 | 2 | 9 | 1 | | 1572 | 1 | 9 | 1 |
| 2440 | 2 | 6 | 11 | | 2141 | 1 | 3 | 0 |

## Dutch Money.

| Gui. | Stiv. | Phen. | | G | S | Gr. | P. |
|---|---|---|---|---|---|---|---|
| 549 | 19 | 14 | | 197 | 17 | 1 | 7 |
| 317 | 16 | 12 | | 340 | 12 | 0 | 6 |
| 859 | 13 | 8 | | 491 | 13 | 1 | 3 |
| 467 | 10 | 15 | | 749 | 19 | 1 | 4 |
| 2195 | 4 | 1 | | 1780 | 3 | 1 | 4 |
| 1645 | 3 | 3 | | 1590 | 5 | 1 | 5 |
| 2195 | 4 | 1 | | 1780 | 3 | 1 | 4 |

## lb Oz Dw P G Troy Weight

| lb | Oz | P | G |
|---|---|---|---|
| 767 | 10 | 17 | 22 |
| 39 | 6 | 9 | 17 |
| 417 | 11 | 16 | 10 |
| 935 | 9 | 17 | 19 |
| 470 | 10 | 17 | 22 |
| 307 | 9 | 16 | 15 |
| 27 | 11 | 16 | 15 |
| 00 | 0 | 10 | 17 |
| 027 | 11 | 16 | 15. |

| lb | Oz | P | G |
|---|---|---|---|
| 649 | 11 | 19 | 20 |
| 32 | 9 | 6 | 5 |
| 841 | 10 | 11 | 19 |
| 473 | 9 | 17 | 23 |
| 764 | 11 | 0 | 9 |
| 165 | 6 | 10 | 19 |
| 2920 | 11 | 14 | 23 |
| 2270 | 11 | 15 | 3 |
| 2920 | 11 | 14 | 23. |

Dated June th 17.

## Avoirdupois Weight.

| Tons | Cwt | Qr | lb | Oz | D |
|---|---|---|---|---|---|
| 91 | 17 | 2 | 25 | 13 | 15 |
| 19 | 9 | 0 | 17 | 10 | 12 |
| 14 | 13 | 2 | 0 | 9 | 11 |
| 47 | 11 | 3 | 19 | 14 | 0 |
| 69 | 0 | 1 | 0 | 0 | 12 |
| 77 | 19 | 3 | 27 | 15 | 11 |
| 320 | 12 | 2 | 0 | 0 | 13 |
| 228 | 14 | 3 | 10 | 2 | 14 |
| 320 | 12 | 2 | 0 | 0 | 13 |

| Tons | Cwt | Qrs | lb |
|---|---|---|---|
| 59 | 13 | 2 | 17 |
| 6 | 17 | 1 | 21 |
| 45 | 11 | 3 | 25 |
| 57 | 16 | 2 | 19 |
| 75 | 17 | 3 | 17 |
| 6 | 19 | 0 | 26 |
| 252 | 16 | 3 | 14 |
| 193 | 3 | 0 | 25 |
| 252 | 16 | 3 | 14 |

## Apothecaries Weight.

| lb | Oz | D | S | G |
|---|---|---|---|---|
| 9 | 10 | 5 | 2 | 12 |
| 6 | 5 | 6 | 1 | 17 |
| 8 | 9 | 4 | 0 | 6 |
| 7 | 1 | 0 | 1 | 17 |
| 2 | 3 | 1 | 0 | 6 |

| | | | |
|---|---|---|---|
| 7 | 6 | 1 | 17 |
| 9 | 5 | 2 | 12 |
| 6 | 1 | 0 | 16 |
| 9 | 3 | 2 | 19 |
| 33 | 1 | 2 | 4 |

# Wine Measure.

| Hhd. | Gal. | Qu. | Pts. |
|---|---|---|---|
| 51 | 53 | 1 | 1 |
| 27 | 39 | 3 | 0 |
| 9 | 110 | 0 | 1 |
| 0 | 9 | 2 | 1 |
| 16 | 24 | 1 | 1 |
| 5 | 0 | 3 | 0 |
| 110 | 20 | 0 | 0 |
| 50 | 29 | 2 | 1 |
| 110 | 20 | 0 | 0 |

| T | G | Qt | Pts. |
|---|---|---|---|
| 37 | 39 | 3 | 1 |
| 9 | 17 | 2 | 1 |
| 4 | 20 | 0 | 0 |
| 32 | 19 | 1 | 1 |
| 9 | 0 | 3 | 1 |
| 12 | 40 | 1 | 1 |
| 106 | 20 | 0 | 1 |
| 68 | 22 | 1 | 0 |
| 166 | 20 | 0 | 1 |

# Ale and Beer Measure

Dated June the 24.

| A.B. | F. | G. |
|---|---|---|
| 49 3497 | 3 | 7 |
| 26 | 2 | 3 |
| 9 | 0 | 4 |
| 17 | 3 | 0 |
| 27 | 1 | 6 |
| 19 | 3 | 7 |
| 150 | 3 | 1 2/4 |
| 100 | 3 | 3 |
| 150 | 3 | 1 2/4 |

| Hhd. | G. | Qts. |
|---|---|---|
| 379 | 53 | 0 |
| 19 | 0 | 1 |
| 127 | 37 | 2 |
| 467 | 19 | 1 |
| 591 | 16 | 0 |
| 75 | 0 | 2 |
| 1654 | 19 | 1 |
| 1274 | 19 | 2 |
| 1654 | 19 | 1. |

| Qrs. | Bu. | Pk. | Qt. |
|---|---|---|---|
| 64 | 7 | 3 | 7 |
| 9 | 4 | 1 | 5 |
| 19 | 6 | 2 | 1 |
| 4 | 0 | 2 | 0 |
| 17 | 3 | 0 | 6 |
| 9 | 5 | 3 | 4 |
| 125 | 4 | 1 | 7 |
| 60 | 4 | 2 | 0 |
| 125 | 4 | 1 | 7 |

| C. | Bu | Pk | Qts. |
|---|---|---|---|
| 37 | 27 | 3 | 5 |
| 6 | 29 | 1 | 7 |
| 15 | 30 | 0 | 0 |
| 4 | 11 | 3 | 0 |
| 5 | 0 | 1 | 0 |
| 2 | 0 | 2 | 1 |
| 72 | 3 | 3 | 5 |
| 34 | 0 | 0 | 5 |
| 72 | 3 | 3 | 5 |

John H Goddard Portsmouth
Jany

# Compound Subtraction.

Teaches to find the difference, inequality, or exceſs, between any two ſums of divers denominations. Rule. Place those numbers under each other, which are of the same denomination, the leſs being below the greater; begin with the least denomination; & if it exceed the figure over it, borrow as many units, as make one of the next greater; ſubtract it therefrom and to the difference add the upper other you borrowed; remembering, always, to add one to the next ſuperior denomination; for that which

| £ | S | D | Q^rs |
|---|---|---|---|
| 791 | 9 | 0 | 1 |
| 197 | 16 | 4 | 2 |
| 593 | 13 | 3 | 3 |
| 791 | 9 | 0 | 1 |

| £ | S | D | Q^rs |
|---|---|---|---|
| 433 | 9 | 10 | 1 |
| 190 | 0 | 10 | 3 |
| 243 | 0 | 11 | 2 |
| 433 | 9 | 10 | 0 |

## Troy Weight

| lb | Oz | P | G |
|---|---|---|---|
| 379 | 0 | 12 | 10 |
| 140 | 4 | 16 | 19 |
| 231 | 3 | 15 | 15 |
| 379 | 0 | 12 | 10 |

| lb | Oz. | Pwt. | Gr. |
|---|---|---|---|
| 749 | 5 | 13 | 16 |
| 96 | 9 | 19 | 13 |
| 652 | 7 | 14 | 3 |
| 749 | 5 | 13 | 16 |

## Avoirdupois Weight

| lb | Oz | Dr. |
|---|---|---|
| 7 | 9 | 12 |
| 3 | 12 | 9 |
| 3 | 13 | 3 |
| 7 | 9 | 12 |

| T. | Cwt | Qr. | lb | Oz. | Dr. |
|---|---|---|---|---|---|
| 9 | 11 | 3 | 17 | 5 | 12 |
| 3 | 12 | 1 | 19 | 10 | 9 |
| 5 | 19 | 1 | 25 | 11 | 3 |
| 9 | 11 | 3 | 17 | 5 | 12 |

## Apothecaries Weight.

| lb | Oz | Dr. | S. | G. |
|---|---|---|---|---|
| 71 | 9 | 3 | 1 | 13 |
| 37 | 0 | 4 | 1 | 16 |
| 34 | 0 | 6 | 2 | 17 |
| 71 | 9 | 3 | 1 | 13 |

| lb | Oz | Dr. | S. | G. |
|---|---|---|---|---|
| 65 | 10 | 6 | 2 | 10 |
| 31 | 0 | 4 | 2 | 9 |
| 34 | 2 | 2 | 0 | 1 |
| 65 | 10 | 6 | 2 | 10 |

whole estate 34755. What is the difference between thrice 5 and 30 & thrice 35? 60. A Merchant began trade with £25327; for 6 years he cleared £1253 per annum; the next five years he cleared 1729 per annum; but the last 4 years had the misfortune to loſe 3019 per annum; What was he worth at the 15 years end? Answer 29414. Dated the 1 of July. —

What number ~~deducted~~ from the 32 part of 3072, will leave the 96th part of the same? Ans. 64. Two boys, A & B, had 850 chesnuts between them; but A had 150 more than B: How many had each? A 500, and B 350. A & B played at marbles, &c. —

What number added to the 27th part of 6615, will make 570? answer 325

# Reductions.

Teaches to bring, or exchange, numbers of one denomination, to others of different denominations, retaining the ſame value. It is of two ſorts Aſcending & deſcending; the latter of which, is performed by multiplication, & the former by division.

# Reduction Deſcending.

## Rule.

Multiply the highest denomination, given, by ſo many of the next leſs as make one of that greater, & thus continue until you have brought it down as low as your question requires. Proof. Change the order of the question, & divide your last product by the last multiplier, and so on.

| £ | S. | D. | Qr. |
|---|---|---|---|
| 95 | 11 | 5 | 3 |
| 20 | | | |
| 1911 | | | |
| 12 | | | |
| 22937 | | | |
| 4 | | | |
| 91751 | | | |

| £ | S | D |
|---|---|---|
| 719 | 9 | 11 |
| 20 | | |
| 14389 | | |
| 12 | | |
| 172679 | | |
| 2 | | |
| 345358 | | |

| Gu. | S |
|---|---|
| 29 | 28 |
| 28 | |
| 232 | |
| 58 | |
| 812 | |
| 12 | |
| 9744 | |

In 37 pistoles at 22 ſhillings, how many ſhillings pence & farthings

P. S. P. S.

37 22

22

814

12

9768

4

39072

In 49 half johannes, at 40 ſhillings, how many ſixpences?

49 40s.

40

392

196

2352

2

ans. 4704

In 473 french Crowns, at 6/0, how many three pences?

473

60

3 | 37040

ans. 12613⅓.

In 53 Moidores at 36s. how many ſhillings, pence & farthings?

Moi. S.

53 36

310

159

1900

12

22809 6

15004

Reduce 47 Guineas, & one fourth of a Guinea, into ſhillings, sixpences, groats, threepences, two pences, and farthings.

Guineas,

47, & ¼ = 7 Shillings.

28

376

94

1316

7

ans. 1323 ſhillings.

2

2646 Sixpence

3

5292 Threepences.

3

15876 pence.

4

63504 2rs.

4 | 15876 Pence.

3969 Groats.

2

7938 Twopences.

In £29, how many groats, threepences, pence & farthings?

Answer. 1740 Groats,

2320 Threepences.

6960 Pence.

27840. 2rs.

# Reduction Aſcending.

Rule.

Divide the loweſt denomination given, by ſo many of that name as make one the next higher, & thus continue till you have brought it into that denomination, which your question requires. Examples.

In 547025 Q^rs. how many pounds, Shillings & Pence?

4/547025
136031
12/136031
11402 – 7
2|0)1140|2
anno. 570

In 39072 Q^rs, how many pistoles, at 22 ℔?

4/39072
9768
12(9768
814
22/814
37.

Dated the 8^th of July.

Reduce 9744 pence to guineas, at 20 shil. per Guinea?

12/9744
812..
20/812
29 – 12

In 4704 ſixpences, how many half johannes?

2)4704
2352
40)2352
49

Bring 91751 farthings into pence

4/91751
22937

Bring 345050 half pence into pence S. & pounds.

2(345050
172629

12(172629
14309 – 11

20/14309
71 9

Bring 35177 farthings into pounds.

4/35177
8794
12/8794
732 – 10
20(732
36 – 12

# Reduction Deſcending & Aſcending.

In 59 half Joes, 37 Moidores. 45 Guineas, 63 Pistoles, 24 E.Cr. 19 Dol. how many Pounds, half joes, moidores, Guineas pistoles, E.Cr. Dol., Shil., Pence & 2rs?

59 H.Jo.
40
472
236
ans. 2032
37 mo.
36
222
111
ans. 1332.
45 Gu.
28
360
90
ans. 1260
63 Pist.
22
126
126
ans. 1386

24
80
12)1920
ansr. 160
19 Dollars
6
ansr. 114
20)7004
ansr 354—4
40)7004
40
220
192
364
336
ansr. 28.

Money

In £97 Pounds, how many pence & English Crowns?

97
3
291
291
80
3280.D.

In 947 En. Cr. at 6/8, how many shillings & En. Guineas?

947
6
6313 s – 4 D.
20/6313
£ 225. 13/4 d.

In 519 En. Half Crown, how many pence & Pounds?

519
40
20760
answ. Pence.
12/20760
1730
20/1730
Pounds.
answ. 86 – 10

In 1259 Groats, how many Qrs., Pence, Shill. and Guineas?

1259
16
7554
1259
answ. 20144.
1259
4

answ. 5036 d.
3/1259
419 8 d.

In 407 Troy Oz. Weight, how many Pnts. & Gr.?

407
20
9740
9740
24
38960
19480
233760

In 13 Ingots of Gold, each weighing 902 5 pnts. how many grains?

20
185
24
740
370
4440
13
1332 0
444 0
57720.

In 97397 Gr. how many £?

24) 97397
20) 4058 - 5 Gr.
12) 202,, 18 Pwts.
lb 16, 10 Oz.

How many rings, each weighing 5 pwts. 7 Gr. may be made of 5 lb 5 oz 16 pwts. 2 Gr. of Gold

24
20
480
12
5760
3
17280
5
20
100
24
2400
16
24
64
32
806
127) 20066 ( 158
127
736
605
1016
1016

Apothecaries Weight.

In 9 lb 8 oz. 1 dr. 2 Scr. 19 Gr. how many Grains?

9
12
108
8
864
3
2592
20
51840
8
8
64
3
192
20
3840
1
3
20
60
2
20
40
ans. 55799 Gr.

In 55799 Grains, how many Pounds?

# Rule.

1st Divide by any number that will divide two, or more, of the given numbers without a remainder, and ſet the quotients, together with the undivided numbers, in a line beneath. 2d Divide the ſecond line, as before, and ſo on, till there are are no two numbers that can be divided; then the continued products, of the diviſors and quotients will give the multiple required. —

## Examples.

```
5)3 5 8 10        5)6 10 16 20        2)6 8
2)3 1 8 2         2)6 2 16 4            3 4
  3 1 4 1         2)3 1 8 2
                    3 1 4 1
                                          2
   5                  5                   3
   2                  2                   6
  10                 10                   4
   3                  2                  24
  30                 20
   4                  3
 120                 60
                      3
                    240
```

# Reduction of Vulgar Fractions —

Is the bringing them out of one form into another, in order to prepare them for the operations of Addition, Subtraction, &c.

## Case the 1.

To abbreviate, or reduce fractions to their lowest terms.

## Rule.

Divide the terms of the given fraction, by any number, which will divide them without a remainder; and the quotients, again without a remainder in the ſam manner; and ſo on, till it appears that there is no number greater than one, which will divide them; and the fraction will then be in its lowest terms. Or. Divide both the terms of the fraction by their greatest common meaſure, and the quotients will be the terms of the fraction required.

## Examples.

Reduce $\frac{288}{480}$ to its lowest terms.

```
288)480(1                         96)288(3
    288                              288
    192)288(1                         96)480(5
        192                              480
         96)192(2
                                          3/5
```

Reduce $\frac{384}{1152}$ to its lowest terms. Sat. July 29. 1797

384 ( 1152 ( 3
1152

$\frac{3}{1}$

Reduce 57,456.

46 ( 184 ( 4
184

$\frac{1}{4}$

57 ( 456 ( 8
456

$\frac{1}{8}$

96 ( 544 ( 5
480

64 ( 96 ( 1
64

32 ( 64 ( 2

32 ( 544 ( 17
544

32 ( 96 ( 3
96

answ. $\frac{3}{17}$

## Case th. 2d.

*To reduce a mixed number to its equivalent improper fraction.*

## Rule.

Multiply the whole number by the denominator of the fraction, and add the numerator of the fraction to the product; under which, subjoin the denominator, and it will form the fraction required.

## Examples.

Reduce 36 $\frac{5}{8}$ to its equivalent improper fraction.

Reduce 127 $\frac{4}{17}$

Reduce 653 $\frac{3}{19}$

36
8
293
293
8

127
17
889
127
2163
17

653
19
5877
653
12410
19

## Case th. 3d.

*To reduce a whole number to an equivalent fraction.*

## Rule.

Multiply the whole number by the given denominator, ~~of the fraction, and add the numerator.~~ Place the product over the said denominator, & it will form the fraction required.

## Examples.

Reduce 6 to a fraction, whose denominator shall be 8.

6
8
48
8

15
12
30
15
180
12

100
70
7000
70

# Case th 4th.

To reduce an improper fraction to its equivalent whole or mixd number.

## Rule.

Divide the numerator by the denominator; the quotient will be its whole number, and the remainder, if any, will be the numerator to the given denominator.

### Examples.

Reduce $\frac{293}{8}$ to its equivalent whole.

```
17)2163(127      8)293(36 5/8      19)12410(653
   17              24                 114
   --              --                 ---
   46              53                 101
   34              48                  95
   --              --                  --
   123              5                  60
   119                                 57
   ---                                 --
     4                                  3      653 3/19
```

# Case th 5th.

To reduce a compound fraction to an equivalent simple one.

## Rule.

Multiply all the numerators continually together for a new numerator, & all the denominators, for a new denominator, and they will form the simple fraction required. If part of the compound fraction be a whole or mixd number it must be reduced to an improper fraction, by case th 2d or 3d. If the denominator of any member of a compound fraction be equal to the numerator of another member thereof, these equal numerators & denominators may be expunged, & the other members continually multiplied (as by the rule,) will produce the fraction required in lower terms.

### Examples.

Reduce $\frac{3}{4}$ of $\frac{4}{6}$ of $\frac{5}{6}$ of $\frac{4}{12}$ to a simple fraction.

$\frac{5}{8}$ $\frac{6}{7}$ $\frac{15}{19}$ to a simple frac.

$\frac{1}{4}$ of $\frac{1}{2}$ of $\frac{3}{4}$ of $12\frac{1}{2}$ to simple frac.

```
  5        8         4          3          4      1
  6        7         5          4          2      1
 --       --        --         --         --     --
 30       56        20         12          8      1
 15       19         6          5          4      3
---      ---       ---         --         --     --
150      504       120         60         32      3
 30       56        12         11          2      1
---     ----      ----        ---         --     --
450     1064      1440        660         64      3
                              660                111
                             ----
                             1440         111
                                          ---
                                           64

2(1064(532
2(450(225

         225
answer. ---
         450
```

# Case th 6th.

To reduce fractions of different denominators to equivalent fractions, having a common denominator.

## Rule th 1st.

Multiply each numerator into all the denominators, except its own for a new numerator & all the denominators into each other, continually, for a common denominator.

## Examples.

Reduce $\frac{1}{2}$ $\frac{2}{3}$ of $\frac{5}{6}$ $7\frac{3}{4}$ $\frac{3}{13}$ to a common denominator.

$$\frac{1}{2} \cdot \frac{2}{3} \text{ of } \frac{5}{6} = \frac{10}{18} \Big\{ \frac{1}{2}\ \frac{10}{18}\ \frac{31}{4}\ \frac{3}{13}$$

$$\begin{aligned} 1 \times 18 \times 4 \times 13 &= 936 = \\ 10 \times 2 \times 4 \times 13 &= 1040 = \\ 31 \times 2 \times 18 \times 13 &= 14508 = \\ 3 \times 2 \times 18 \times 4 &= 432 = \end{aligned}$$

$$\frac{936}{1872} \cdot \frac{1040}{1872} \cdot \frac{14508}{1872} \cdot \frac{432}{1872}$$

answer.

## Rule 2d.

To reduce any given fractions to others, which ſhall have the least common denominator.

1. By Problem 2, page 72d. find the least common multiple of all the denominators of the given fractions, and it will be the common denominator required. 2. Divide the common denominator by the denominator of each fraction, & multiply the quotient by the numerator, & the product will be the numerator of the fraction required.

## Examples.

Reduce $\frac{1}{3}$ $\frac{3}{4}$ $\frac{7}{8}$ to fr. having the least common denominator poſsible.

$$\frac{1}{3}\ \frac{3}{4}\ \frac{7}{8}$$

$$4\,)\,3\ \ 4\ \ 8 \qquad 3\ \ 1\ \ 2$$

$$3 \times 2 = 6, \quad 6 \times 4 = 24$$

$$3\,(24 \;\; 8 \qquad 4\,(24 \;\; 6,\ 6 \times 3 = 18 \qquad 8\,)\,24 \;\; 3,\ 3 \times 7 = 21$$

$$\frac{8}{24}\ \frac{18}{24}\ \frac{21}{24}$$

## Caſe 7th.

To reduce a fraction of one denomination to the fraction of another, but greater, retaining the ſame value.

### Rule.

Reduce the given fraction to a compound one, by comparing it with all the denominations between it & that denomination you reduce it to. Laſtly, reduce this compound fraction to a ſimple one, by case 5, & you will have a fraction of the required denomination, equal in value to the given fraction.

## Examples.

Reduce $\frac{3}{5}$ of a penny to the fr. of a £.

$$\frac{3}{5} \text{ of } \frac{1}{12} \text{ of } \frac{1}{20} = \frac{3}{1200} \text{ ans.} = \frac{1}{400}$$

$$12 \times 5 = 60, \quad 60 \times 20 = 1200$$

Reduce $\frac{3}{4}$ of a farthing to the fraction of a Pound.

$\frac{3}{4}$ of $\frac{1}{4}$ of $\frac{1}{12}$ of $\frac{1}{20}$

$3 \times 1 \times 1 \times 1 = 3 = \frac{1}{}$

4
4
16
12
192
20
3840

3) 3840 ( 1280
1280

Reduce $\frac{5}{8}$ of a penny to the fraction of a Guinea.

$\frac{5}{8}$ of $\frac{1}{12}$ of $\frac{1}{28}$

8
12
96
28
768
192

answ. 2688.

## Case th 8th

To reduce a fraction of one denomination, but leſs, retaining the ſame value, to the fraction of another.

### Rule.

Multiply the given numerator by the parts of the denominator between it & that denomination you would reduce it to, for a new numerator, which place over the given denominator. Or, only invert the parts contained in the integer, and make of them a compound fraction as before, then, reduce it to a ſimple one.

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## Examples.

Reduce $\frac{1}{1280}$ of a pound to the fraction of a Qr.

$\frac{1}{1280}$ of $\frac{20}{1}$ of $\frac{12}{1}$ of $\frac{4}{1}$

20
20
12
240
4
960
1280

16) $\frac{960}{1280} = \frac{96}{128}$

4) $\frac{96}{128} = \frac{24}{32}$

4) $\frac{24}{32} = \frac{6}{8}$ answ.

2) $\frac{6}{8} = \frac{3}{4}$

$\frac{1}{57}$ of $\frac{36}{1}$ of $\frac{20}{1}$

36
36
20
720

3) $\frac{720}{57} = \frac{240}{19}$

19) 240 ( 12

answ. $\frac{12}{19}$ s

## Caſe th 9.

To find the value in the known parts of the integer, as of coin, weight, measure &c.

### Rule.

Multiply the numerator by the parts in the next inferior denomination, & divide the product by the denominator, & if any thing remain, multiply it by the next inferior denomination, & divide by the denominator, as before, & ſo on, as far as neceſsary; & the quotients placed after one another, in their order, will be the answer required.

## Examples.

What is the value of $\frac{5}{7}$ of a £.

What is the value of $\frac{9}{24}$ of a Shilling

$5$
$20$
$7 | 100 \quad 14^{s.} \; 2$
$12$
$7 | 24 \quad 3^{d.} \; 3$
$4$
$7 | 12 \quad 1\frac{5}{7}$ qr.

$\frac{9}{24}$   $9$
$12$ answ.
$24 | 108 ( 4\frac{1}{2}$
$96$
$12$
$4$
$24 | 48 ( 2$
$48$

$\frac{4}{5}$   $16$
$4$ ans. oz
$5 ) 64 ( 12 \; 12$ Dr. $\frac{4}{5}$
$5$
$14$
$10$
$4$
$16$
$5 ) 64 ( 12$
$5$
$14$
$10$
$4$

## Case 10th.

To reduce any given quantity to the fraction of any greater denomination of the same kind.

## Rules.

Reduce the given quantity to the lowest term mentioned, for a numerator; then reduce the integral part to the same term; for a denominator; which will be the fraction required.

## Examples.

Reduce 12 oz 12 Dr. $\frac{4}{5}$ to the fraction of an avoird. lb.   7 oz. 4 pwts. to lb Troy.

$12 \times 16 = 192$ (written 84, 12, 204), $\times 5 = 1024$

$16 \times 16 = 96, 16 = 256$, $\times 5 = 1280$

$8 | \frac{1024}{1280} | \frac{128}{160}$
$8 | \frac{128}{160} | \frac{16}{20}$
$4 | \frac{16}{20} | \frac{4}{5}$

$7'' \; 4$   $12$
$20$   $20$
$144$   $240$
$12 ) \frac{144}{240} | \frac{12}{20} | 4 ) \frac{12}{20} | \frac{3}{5}$

Reduce two qrs. 2 $\frac{2}{3}$ n. to the fr. of a yard.

$2^{qr.} \; 2\frac{2}{3}$
$2$
$4$
$8$
$2\frac{4}{}$
$18$

$4$
$4$
$16$
$2\frac{4}{}$
$38$
$3$
$116$

$6 ) \frac{116}{18} ( \frac{18}{6}$
$9 ) \frac{18}{6} | \frac{2}{3}$

Reduce 4 qrs. $1\frac{1}{2}$ to the fr. of E. E.

$5$
$4$
$20$
$2$
$40$

$4$
$4$
$18$
$2$
$5 | \frac{35}{40} ( \frac{7}{8}$

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# Addition of Vulgar Fractions.

## Rule.

Reduce compound fractions to ſingle ones; mix'd numbers to improper fractions; fractions of different integers to those of the same; and all of them to a common denominator; then the sum of the numerators, written over the common denominator, will be the sum of the fractions required.

## Examples.

August 19

Add $7\frac{4}{5}$ $\frac{5}{7}$ of $\frac{3}{8}$ and 7 together.

$\frac{39}{5}\ \frac{15}{56}\ \frac{7}{1}$

$39 \times 56 \times 1 = 2184$

$15 \times 5 \times 1 = 75$

$7 \times 5 \times 56 = 1960$

$\frac{4219}{280} = 15\frac{19}{280}$

Add $\frac{3}{7}$ $9\frac{1}{5}$ & $\frac{2}{3}$ of $\frac{1}{2}$ together

$\frac{3}{7}\ \frac{46}{5}\ \frac{2}{6}$

$90 + 1932 + 70 = 2092$

$\frac{2092}{210} = 9\frac{202}{210} = 9\frac{101}{105}$

What is the sum of $\frac{4}{5}$ $\frac{5}{6}$ of $\frac{3}{8}$ $\frac{1}{4}$ & $\frac{4}{13}$?

$\frac{4}{5}\ \frac{15}{192}\ \frac{1}{4}\ \frac{4}{13}$

$99840 + 975 + 3120 + 10704$ …

$103680 + 9984 + 975 = 114639$

$\frac{114639}{12480} = 9\frac{2319}{12480}$

# The tenth Caſe Continued.

Reduce 4 Cwt. 2 qrs. 12 lb 14 oz 12 4/13 to to the fr. of a ton.

```
     4                      20
     4                       4
    18                      80
    28                      28
   136                     640
    36                    160
   516                    2240
    16                      16
  3110                   13440
   516                   2240
  8270                   35840
    16                      16
 49632                  215040
  8270                   35840
132332                  573440
    13                      13
 397000                1720320
 132332                 573440
1720320                7454720
7454720
```

```
1720320)7454720(4
        6881280
         573440

573440)1720320(3/13
       1720320

573440)7454720(13
       573440

        1720320
        1720320
```

Reduce 6 fur. 26 po. 11 feet to the frac. of a mile.

```
    6            8
   40           40
  266          320
   16½          16½
 1596         1920
  266          320
  133          160
 4400         5280
```

```
4400|5280(1
     4400
      880 |4400| 5/6     880)5280|6
           4400              5280
```

# The tenth Case continued.

Reduce 21s. 7⅕d. to the fraction of a Moidore.

```
  21          36          1296)2160(1
  12          12               1296
 259         432                864)1296(1
   5           5                     864
1296        2160                 432)864(1
                                     432
432|1296|3/5     432|2160|5
```

Reduce 3 ro. 17 po. 1/7 to the fraction of an acre.

```
  3           4         960)1120(1
 40          40              960
137         160              160)960(6
  7           7                  960
960        1120              160|1120|7
                                 1120
```

Reduce 5s. 7½d. to the fraction of a Dollar.

```
  5           6         135)144(1
 12          12              135
 67          72               9)135(15
  2           2                 45     9)144(16
135         144
```

Reduce 16h. 36m. 35s. to the fr. of a day.

```
    16              24
    60              60
   996            1440
    60              60
 59815           86400
    13              13.
179445          259200
 59815           86400
777600         1123200

1123200                86400|777600 = 9
 777600                86400|1123200 = 13
 345600)777600(2
        691200
   86400)345600|4
         345600
```

# Addition of Vulgar Fractions Continued.

What is the sum of $\frac{7}{10}$ of $4\frac{5}{8}$ $\frac{3}{4}$ of $\frac{1}{3}$ & $9\frac{1}{4}$?

$\frac{259}{80}\ \frac{3}{12}\ \frac{37}{4}$

259 × 12 = 3108; 3108 × 4 = 12432

3 × 80 = 240; 240 × 4 = 960

37 × 80 = 2960; 2960 × 12 = 35520

35520
12432
960
40912

80 × 12 = 960; 960 × 4 = 3840

3840 ) 40912 ( 12
46080
2832

| 12 | 2832 | 236 |
|---|---|---|
| | 3840 | 320 |
| 4 | 236 | 59 |
| | 320 | 80 |

Add $\frac{1}{9}$ $\frac{2}{7}$ $\frac{3}{4}$ & $\frac{4}{5}$ together.

$\frac{20}{9}\ \frac{3}{7}\ \frac{4}{60}$

20 × 7 = 140; 140 × 60 = 8400

3 × 9 = 27; 27 × 60 = 1620

4 × 9 = 36; 36 × 7 = 252

8400
1620
252
10272

3780 ) 10272 ( 2 £
7560
2712
12
3780 ) 32544 ( 8 s.
30240
2304

| 36 | 2304 | 64 |
|---|---|---|
| | 3780 | 105 |

What is the sum of $\frac{2}{3}$ of $17\frac{1}{2}$ $9\frac{5}{8}$ & $\frac{2}{3}$ of $\frac{1}{2}$ of $\frac{4}{7}$?

$\frac{34}{5}\ \frac{77}{8}\ \frac{8}{42}$

34 × 8 = 272; 272 × 42 = 544, 1088, 11424

77 × 5 = 385; 385 × 42 = 770, 1540, 16170

8 × 5 = 40; 40 × 8 = 320

11424
16170
320

1680 ) 27914 ( 16 £
16800
11034
20
1680 ) 220680 ( 12 s.
20160
520
12
1680 ) 6240 ( 3 d.
5040
1200

5 × 8 = 40; 40 × 42 = 1680

| 12 | 1200 | 100 |
|---|---|---|
| | 1680 | 140 |
| 5 | 100 | 20 |
| | 140 | 28 |
| 4 | 20 | 5 |
| | 28 | 7 |

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# Subtraction of Vulgar Fractions.

## Rule.

Prepare the fractions as in Addition, and the difference of the numerators written above the common denominator, will give the difference of the fractions required. Note, a fractions is subtracted from a whole number, by taking the numerator of the fraction from its denominator, and placing the remainder over the denominator, then taking one from the whole number.

## Examples.

From $37\frac{1}{4}$ take $19\frac{4}{7}$.

$$\frac{37 \times 4 + 1}{4} = \frac{149}{4} \qquad \frac{19 \times 7 + 4}{7} = \frac{137}{7}$$

$$149 \times 7 = 1043 \qquad 137 \times 4 = 548 \qquad 4 \times 7 = 28$$

$$1043 - 548 = 495 \qquad 28)\,495\,(17 \quad \begin{array}{r} 28 \\ \hline 215 \\ 196 \\ \hline 19 \end{array} \qquad 17\frac{19}{28}$$

From $\frac{3}{4}$ take $\frac{2}{7}$ of $\frac{5}{8}$.

$$\frac{2 \times 5}{7 \times 8} = \frac{10}{56} = \frac{5}{28} \quad \text{then the fr. are } \frac{3}{4}\ \frac{5}{28}$$

$$28 \times 4 = 112 \qquad 4 \times 5 = 20 \qquad 28 \times 3 = 84$$

$$\frac{84}{112} - \frac{20}{112} = \frac{64}{112} \qquad 16)\,\frac{64}{112}\left\{\frac{4}{7}\right. \text{rem.}$$

From $13\frac{1}{3}$ take $\frac{3}{4}$ of 15.

$$\frac{13 \times 3 + 1}{3} = \frac{40}{3} \qquad \frac{15 \times 3}{4} = \frac{45}{4}$$

$$40 \times 4 = 160 \qquad 45 \times 3 = 135 \qquad 160 - 135 = 25$$

$$12)\,25\,(2 \quad \begin{array}{r} 24 \\ \hline 1 \end{array} \qquad 2\frac{1}{12}$$

From $\frac{49}{50}$ take $\frac{5}{9}$.

$$\frac{49}{50}\ \frac{5}{9} \qquad 50 \times 5 = 250 \qquad 49 \times 9 = 441 \qquad 9 \times 50 = 450 \qquad 49 \times 5 = 245$$

$$441 - 250 = 191 \qquad \frac{191}{450}$$

From $\frac{1}{4}$ of a £ take $\frac{9}{10}$ of a S.

$\frac{1}{4}$ of $\frac{20}{1}$ = $\frac{20}{4}$ $\frac{9}{10}$ $\frac{20 \times 10}{4 \times 9}$ $\frac{200}{36}$

200
36
40 | 164 | 4s.
160
4
12
40 | 48 | 1
40
8 = $\frac{1}{5}$

From $\frac{5}{7}$ of oz. take $\frac{3}{4}$ pwt.

$\frac{5}{7}$ of $\frac{20}{1}$ $\frac{3}{4}$

$\frac{100}{7}$ $\frac{3}{4}$

28 | 360 | 12
336
24 = $\frac{6}{7}$

100
4
400
21
28 | 379 | 13
364
15
24
60
30
360

From $\frac{1}{2}$ of a lea. take $\frac{3}{8}$ of a mi.

$\frac{1}{2}$ of $\frac{3}{1}$ $\frac{3}{8}$ $\frac{3}{2}$ $\frac{3}{8}$ $\frac{3 \times 8}{2 \times 3}$

24
6
8 × 2 16 | 18 | 1m.
16
2
8
16 | 16 | 1fur.
16

From 5 we. take 19 $\frac{4}{5}$ days.

$\frac{5}{1}$ $\frac{7}{1}$ $\frac{19}{5}$ $\frac{4}{5}$ $\frac{35}{1}$ $\frac{99}{5}$

35
5
175
99
5 | 76 | 15d.
75
1
5 | 24 | 4ho.
20
4
60

5 | 240 | 48
240

ans. 15d. 4ho. 48m.

# Multiplication of Vulgar Fractions.

## Rule.

Reduce compounds fractions to simple ones, and mixed numbers to improper fractions, then the product of the numerators will be the numerator, and the product of the denominators, the denominator of the product required. Note, where several fractions are to be multiplied, if the numerators of one fraction be equal to the denominator of another, their equal numerators & denominators may be omitted.

Multiply $\frac{1}{3}$ of 5 by $\frac{3}{4}$ of $\frac{2}{7}$.

$\frac{1}{3}$ of $\frac{5}{1}$ = $\frac{5}{3}$ $\frac{3}{4}$ of $\frac{2}{7}$ = $\frac{6}{28}$ $\frac{5}{3}$ $\frac{6}{28}$

$\frac{6 \times 5}{3 \times 28} = \frac{30}{84}$ 6 | 30 | 5 ; 84 | 14

Multiply $\frac{4}{17}$ by $\frac{5}{27}$. $\frac{5 \times 4}{27 \times 17} = \frac{20}{459}$

Multiply $5\frac{1}{4}$ by $\frac{1}{6}$ $5 \times 4$ $\frac{21}{4}$ $\frac{1}{6}$ = $\frac{21}{24}$ 3 | 21 | 24 | $\frac{7}{8}$

Multiply $9\frac{3}{4}$ $\frac{1}{2}$ of $\frac{2}{5}$ $12\frac{4}{7}$ continually together.

$9 \times 4$ $\frac{39}{4}$ $\frac{1}{2}$ of $\frac{2}{5}$ $12\frac{4}{7}$ $\frac{39}{4}$ $\frac{2}{10}$ $\frac{12\ 4}{7}$

$\frac{39 \times 2 \times 88}{4 \times 10 \times 7} = \frac{6864}{280}$ 8 | 280 | 35 ; 280 280 | 6864 | $24\frac{18}{35}$ ans. ; 6720 ; 8 | 144 | 18 ; 144

What is the continual product of $\frac{3}{4}$ of $\frac{2}{3}$ $5\frac{1}{2}$ $\frac{7}{3}$ $\frac{1}{8}$ of $\frac{5}{8}$?

$\frac{6}{12}$ $\frac{11}{2}$ $\frac{35}{24}$ $\frac{576}{2360}$ 6 | 576 | 4$\frac{1}{96}$ ; 576 576 | 2360 | 4 ; 2304 ; 56

Multiply $\frac{3}{7}$ of $\frac{5}{9}$ by $\frac{4}{5}$ of $\frac{1}{5}$ of $11\frac{3}{7}$

$\frac{3}{7}$ of $\frac{5}{9}$ = $\frac{15}{63}$ $\frac{4}{5}$ of $\frac{1}{5}$ = $\frac{4}{25}$ of $\frac{80}{7}$ = $\frac{320}{175}$

$\frac{15 \times 320}{63 \times 175} = \frac{4800}{11025} = \frac{64}{147}$

What is the continual product of $7\frac{1}{2}$ $\frac{5}{7}$ of $\frac{8}{9}$ $3\frac{1}{9}$?

$\frac{7 \times 15 \times 28}{2 \times 56 \times 9} = \frac{2940}{1008}$ 1008 | 2940 | $2\frac{11}{12}$ ans. ; 2016 ; 924 | 132 ; 924 ; 12 | 132 | 11 ; 132

# Division of Vulgar Fractions.

# Rule.

*Prepare the fractions as before, then invert the divisor, & proceed exactly as in Multiplication. The products will be the quotients required.*

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Divide $\frac{5}{7}$ by $\frac{3}{5}$.

$\frac{5}{7}$ by $\frac{3}{5}$

$\frac{5 \times 5}{7 \times 3} = \frac{25}{21}$ | 25 / 21 / 4 | $1\frac{4}{21}$

Divide $12\frac{1}{5}$ by $\frac{1}{3}$ of 7.

$\frac{61 \times 3}{5 \times 7}$ $\frac{183}{35}$ | 183 / 175 / 8 | $5\frac{8}{35}$

Divide $\frac{5}{8}$ of $5\frac{1}{6}$ by $7\frac{3}{4}$.

$\frac{41 \times 4}{8 \times 31}$ $\frac{164}{248}$ 4 | 164 / 248 | $\frac{41}{62}$

Divide $\frac{3}{7}$ by 9. $\frac{3}{7}$ $\frac{9}{1}$ $\frac{3}{7}$ $\frac{1}{63}$ | $\frac{3}{63}$ | $\frac{1}{21}$

Divide $\frac{1}{2}$ of $\frac{1}{4}$ of $\frac{2}{3}$ by $\frac{1}{8}$ of $\frac{3}{4}$.

$\frac{2 \times 32}{24 \times 3}$ $\frac{64}{72}$ 8 | 64 / 72 | $\frac{8}{9}$ the Answer.

Divide 7 by $\frac{3}{8}$.

$\frac{7}{1}$ by $\frac{3}{8}$ = $\frac{7}{1}$ by $\frac{8}{3}$ = $\frac{56}{3}$ 3 | 56 / 54 | $18\frac{2}{3}$

Divide $4204\frac{1}{6}$ by $\frac{7}{10}$ of 112.

$\frac{25225}{6}$ $\frac{784}{8}$ $\frac{8}{784}$ $\frac{201800}{4704}$ | 201800 / 197568 / 8 | 4232 | $42\frac{529}{588}$

8 ) 4704 ( 588

# Decimal Fractions.

*Decimals are of such a nature, that they vary in the same proportion, and are managed by the same method of operation as whole numbers are. On this account, every proper fraction is supposed to be reducible to another, whose denominator shall be 10, 100, 1000, &c. namely, unity, with a number of cyphers annexed; and Fractions, with such denominators are called Decimal Fractions: Such as, $\frac{5}{10}$, $\frac{55}{100}$, $\frac{676}{1000}$, &c.*

# Addition of Decimals.

## Rule.

1st. Place the numbers whether mix'd, or pure decimals, under each other, according to the value of their places. 2d. Find their sum as in whole numbers, and point off so many places for decimals, as are equal to the greatest number of decimal places in any of the given number.

## Examples.

Find the sum of 190,73 × 2,3597 × 223 × 0197501, 3478,1 × 12350.

19,073<br>
2,3597<br>
223,<br>
10197501<br>
3478,1<br>
12,350<br>
the Sum 3734,9104501.

The required sum of 429 × 21,37 × 355,003 × 107 × 17

429<br>
21,37<br>
355,003<br>
1,07<br>
1,7<br>
806,143<br>
The sum.

# Subtraction of Decimals.

## Rule.

Place the numbers according to their value; then subtract as in whole numbers, & point off the Decimals as in Addition.

## Examples.

Find the difference of 1793,13 & 817,05693.

1793,13<br>
817,05693<br>
976,07307

From 171,195, take 125,9176.

171,195<br>
125,9176<br>
45,2774

From 480, take 245,0075.

480<br>
245,0075.<br>
234,9925

# Multiplication of Decimals.

## Rule.

### Case the 1st.

1st. Rule. Whether they be mixed, or pure decimals, place the factor, and multiply them as in whole numbers. 2d Point off so many figures from the product as there are decimal places in both the factors; if there be not so many places in the product supply the defect by prefixing cyphers.

## Examples.

Multiply 0 2 3 4 5 by 0 0 1 6 3

```
      0 0 1 6 3
     ----------
      7 0 3 5
    1 4 0 7 0
    2 3 4 5
  --------------
  0 0 0 0 3 8 2 2 3 5
```

Multiply 3 7 5 9 by 9 4 5

```
      9 4 5
  -----------
  1 8 7 9 5
 1 5 0 3 6
3 3 8 3 1
-------------
3 5 5 2 2 5 5
```

# Division of Decimals.

## Rule.

The places of decimal parts in the divisor and the quotient, counted together must always be equal to those in the dividend, therefore, divide as in whole numbers, & from the right hand of the quotient, point off so many places for the decimals, as the dec... al places in the dividend exceed those in the divisor. If the places in the quotient be not so many as the rule requires, supply the defect by prefixing cyphers to the left hand.

If at any time there be a remainder, or the decimal places in the divisor be more than those in the dividend, cyphers may be annexed to the dividend or the remainder, and the quotient carried on to any degree of exactness.

## Examples.

```
219 | 11784.1075 | 0005380
      1095
      ----
       834
       657
      ----
       1771
       1752
       ----
        1907
        1752
        ----
        1555
        1533
        ----
          22
```

```
87
317 | 29,417 | 092.
      2853
      ----
317 |  88  |  2
      634
      ---
       43
```

```
3719 | 380000 | 102,178
       3719
       ----
        8100
        7438
        ----
         6620
         3719
         ----
         29010
         26033
         -----
         29770
         29752
         -----
            18
```

# Reduction of Decimals.

## Case th. 1 st.

To reduce a vulgar Fraction to its equivalent Decimal

## Rule.

Divide the numerator by the denominator, as in division of decimals, and the quotient will be the decimal required: Or, so many cyphers as you annex to the given numerator, so many places must be pointed off in the quotient and if there be not so many places of figures in the quotient, the deficiency must be supplied by prefixing so many cyphers before the quotient figures.

## Examples.

Reduce $\frac{3}{8}$ $\frac{5}{8}$ $\frac{2}{3}$ to a decimal.

8 | 3000 | 375
24
8 | 60 | 7
56
8 | 40 | 5

8 ) 5000 ( 625
40
8 | 20 | 2
16
8 | 40 | 5

ans.
3 | 2000 | 666
18
3 | 20 | 6
18
3 | 20 | 6

Reduce $\frac{5}{1875}$ to a Decimal.

ans.
1875 | 500000 | 00266
3750
11250 0 | 6
11250
12500 | 6
11250
1250

## Case th. Second.

To reduce numbers of different denominations, as of money weight and measure, to their equivalent decimal values.

## Rule.

Write the given numbers perpendicularly under each other for dividends proceeding orderly from the least to the greatest. 2d Opposite to each dividend on the left hand, place such a number for a divisor, as will bring it to the next superiour denomination, and draw a line perpendicularly between them. 3d. Begin with the highest & write the quotient of each division, as decimal parts, on the right hand of the dividend next below it, and so on till they are all used, & the last quotient will be the Decimal sought.

# Examples.

Reduce 17s. 8¾ to the Decimal of a £?

| | | |
|---|---|---|
| 4 | 3 0. | |
| 12 | 8,7 5 0 0 0 0 | 17,7 2 9 1 6 6 |
| 20 | 17,7 2 9 1 6 6 | 8 8 6 4 5 8 |

Reduce 1, 2, 3 qr. to the Decimals of a sh.

48) 1 0 0 0 0 0 ( 2 0 8 3 ×
 9 6
 40 | 0
48) 4 0 0 ( 8
 3 8 4
48) 1 6 0 ( 3
 1 4 4
 1 6

48) 2 0 0 0 0 0 ( 0 4 1 6 6 ×
 1 9 2
48) 8 0
 4 8
48) 3 2 0 ( 6
 2 8 8
48) 3 2 0 ( 6
 2 8 8
 3 2

48) 3 0 0 0 0 | 0 6 2 5
 2 8 8 | The answer.
48) 1 2 0 ( 2
 9 6
48) 2 4 0 ( 5
 2 4 0

Reduce 13 5½ to the Decimal of a £.

| | | |
|---|---|---|
| 4 | 20 | 5 |
| 12 | 5, 5 0 0 0 | 13, 4 5 8 3 |
| 20 | 13, 4 5 8 3 | 6 7 2 9 |

Reduce 3 qrs. 3 n. to the decimal of a yard

| | | |
|---|---|---|
| 4 | 3,0 | 7 |
| | 3,7 5 0 | 9 3 7 5 |

Saturday the 9 of Sepr.

# Case the 3d.

To find the decimal of any number of shillings pence & qrs. by Inspection.

## Rule.

Write half the greatest even number of shillings for the first decimal figure 2. Let the Farthings in the given pence and farthings, possess the 2d & 3 places observing to increase the second places, or place of hundredths by 5. if the shillings be odd, and the 3d. place by 1. when the farthings exceed 12 & by 2 when they exceed 36.

## Examples.

Find the value of 13ˢ 9 3/4 by Inspection.

6 Find by Inspection the decimal exp. of 18ˢ 3 1/4

3
39
2
6 91

8.
5
34 9,13
1 1
805 914

17ˢ 8 1/2.

Value the following Sums by Inspection, & find their total viz. 15ˢ 3ᵈ 8ˢ 11 1/2 10ˢ 6 1/4 1ˢ 0 1/2 1/2 2 3/4

15 3ᵈ
8 11 1/2
10 6 1/4
1 0 1/2
0 1/2
2 3/4
36 " 0 1/2

20)36(1£ 16
8
£ 4
1,834

## Case the 4ᵗʰ.

To find the value of any given decimal in the terms of the integer.

## Rule.

Multiply the Decimal by any number of parts in the next leſs denomination and cut off so many places for a remainder, to the right hand, as there are places 1 in the given Decimal. 2ᵈ Multiply the remainder by the next inferior denomination, and cut off a remainder as before. 3ᵈ Proceed in this manner through all the parts of the integer, and the several denominations, standing on the left hand, make the answer.

---

## Examples.

What is the value of, 73968, of a £?

73968
20
14,79360
12
9,52320
4
2,09280 14ˢ 9ᵈ 1/2

What is the value of, 679 of a S.

679
12
8,148

———— of 713 of a Day?
24
2,852
1426
17,112. 17ʰ 6m. 43 Sec.
60
6,720
60
43,200

———— of 9999 of a Cwt.
20
1,99980
12
11,9760
4
3,904 19ˢ 11 3

# Case the 5th.

To find the value of any Decimal of a £. by Inspection.

## Rule.

Double the first figures, or place of tenths, for shillings, and if the second figure be 5, or more than 5, reckon another shilling; then, after the 5 is deducted, call the figures in the second & third places so many farthings, abating 1, when they are above 12, and 2. when above 36, and the result will be the answer. Note when the Decimal has but 2 figures, if any thing remain after the shillings are taken out, a cypher must be annexed to the right hand, or supposed to be so.

## Examples.

What is value of 876 £?

16. double of 8,
1 for the 5 in the second place, which is to be taken out of 7.
And 6 ½ 26 qrs remain to be added.
& Deduct ¼ for the excess of 12.

17s 6 ¼ The ans.

Find by Inspection the value 49 £.

49

8s = double of 4.
1s For the 5 in the place of hundredths.
10d = 40 qrs. an o being annexed to the remaining 4.
Deduct, ½ for the excess of 36.

answer. 9s 9 ½

# Federal Money.

| | | | |
|---|---|---|---|
| 10 Mills | make one | Cent. m. c. | 10 = 1 |
| 10 Cents | | Dime m. d. | 100 = 10 = 1 |
| 10 Dimes | | Dollar m. D. | 1000 = 100 = 10 = 1 |
| 10 Dollars | | Eagle m. E. | 10000 = 1000 = 100 = 10 = 1. |

# Addition of the Federal Money.

Add 25½ eagles; 7 dollars, 8 dimes, 3 cents, four Mills, 125 dollars, 8 cents; 5 eagles, 9 mills; 10 dollars, 7 cents & four mills together.

| E. D. | d. C. M. |
|---|---|
| 255, | |
| 7, | 834 |
| 125, | 8 |
| 50, | 009 |
| 10, | 74 |
| 455, | 997 |

Note, that the dollars occupy the first place at the left hand of the comma, & eagles all the places at the left hand of dollars.

# Subtraction of F. M.

From. 13479,815
Take 8985,946
4493,869
13479,815

495641,001
218796,795
276844,206
495641,001

# Multiplications.

When you have pointed off the decimals in the product, according to the rule in multiplication of Decimals, all beyond the mills, or third place of decimals, are decimal parts of a mill.

Mult. 40,573
by 37
340,011
145719
1797,201

Mult. 45,846
by 23,094
183,384
4126,14
137538,0
91692
1058767,524
1000

# Division.

3730) 20539 (5 4 3
18650
3730) 16039
14920
3730) 11190
11190

# Compound Multiplication.

## Caseth 1st.

When the quantity does not exceed 12 yards, Pounds, &c. Set down the price of one, & place the quantity underneath the least denomination, for the multiplier, & in multiplying by it, observe the same rules for carrying from one denomination to another, as in compound addition.

## Introductory Examples.

15 17 1
2

2 ) 30 34 2 ( 15 17 1/2 — 3 ) 75 36 24 ( 25 12 8
25 12 8
3

19 6 8 1/4
6

6 | 114 36 49 1/2 | 19 6 8 1/4 |

14 17 10 1/4
9

133 19 2 4/4

## Practical Questions.

What will 9 yards of cloth, at 5d per yd. come to?

s 4d
9

9 | 2 8 " 0 | 5 " 4 |

15 " 4d
3

3 | 2 6 0 | 15 " 4 |

39 " 10 " 3/4
7

7 | 13 13s " 7 0 " 21 | 39 " 10 " 3/4 |

## Caseth 2d.

When the multiplier, that is the quantity, is above 12, you must multiply by two such numbers, as when multiplied together, will produce the given quantity.

## Examples.

Sat. Sepr 16 1797.

What will 24 yards of cloth cost at 6s 3 3/4

£0 6s 3d 3/4 qr.
4
£1 " 5s " 3d
6
£7 11s 6d ans.

| | | | |
|---|---|---|---|
| 6 | £7 11s 6d ans. | 1 " 5 " 3 | |
| 4 | £1 5s 3d | 0 " 6 " 3 " 3/4 | Proof. |

44y at 12 4 1/2

12 " 4 1/2
4
£2 " 9s " 6d
11
£27 " 4s " 6 ans.

| | | |
|---|---|---|
| 11 | £27 " 4s " 6d | £2 " 9s " 6d |
| 4 | 2 " 9 " 6 | £0 " 12s " 4d 1/2 |

# Case th 3.

When the quantity is such a number, as that two numbers in the table will produce it exactly: Then multiply by two such numbers as come the nearest to it & for the number wanting, multiply the given price of one yard, by the said number of yards wanting, & add the products together for the answer; but if the product of the two numbers exceed the given quantity, then find the value of the overplus, which subtract from the last product, & the remainder will be the answer.

## Examples.

What will 47 yards, at 17s 9d per y. come to?

£0 " 17 " 9
5
4 " 8 " 9
9
39 " 18 " 9
1 " 15 " 6
ans. 41 " 14 " 3
1 " 15 " 6

| | |
|---|---|
| 9 | 39 " 18 " 9 |
| 5 | 4 " 8 " 9 |
| | 0 " 17 " 9 Proof. |

75y 5s 7 1/2

5s 7 1/2
6
£1 13s 9d
12
20 " 5 " 0
16 " 10 1/2
21 " 1 " 10 1/2 ans.

| | |
|---|---|
| 12 | 20 " 5 " 0 |
| 6 | 1 " 13 " 9 |
| | 5 " 7 1/2 |

Note, this may be performed by first finding the value of 48 yards, from which if you subtract the price of 1, the remainder will be the answer as above.

## Case the 4th.

When the quantity is any number above the Multiplication table, multiply the price of 1 y. by 10. which will produce the price of 10 yards. This product multiplied by 10 will give the price of 100 y. Then, if the quantity do not exceed hundreds, you must multiply the price of one hundred by the number of hundreds in your question; the price of 10. by the number of tens; & the price of 1. by the number of units; Lastly, add these several products together, & the sum will be the answer.

## Examples.

What 359 ya. of at 4d 7½ per yard, come to?

0 · 4 " 7½
10
2 " 6 " 3
10
23 " 2 " 6
3
69 " 7 " 6
5 times the pr. of 10 y. 11 " 11 " 3
2 " 1 " 7½
answer. 83 " 0 " 4½

(10) 69 " 7 " 6
10 6 " 19 " 9
3 0 " 13 " 11
0 " 4 " 7½ Proof.

297 y. at 17d 3½
10
8 " 12 " 11
10
86 " 9 " 2
2
172 " 18 " 4½
77 " 16 " 3
6 " 1 " 0½
256 " 15 " 7½ answer.

10 | 172 " 18 " 4½ | 17 " 5 " 10
10 | 17 " 5 " 10
2 | 1 " 14 " 7 Proof.
0 " 17 " 3½

## Case the 5th.

When the quantity does not exceed 200, nor the price 12d then; by the pence table find what it comes to at 1 penny per yard, &c, and multiplying this sum by the number of pence, in the price, the product will be the answer.

## Examples

What will 129 y. cost at 9¾ per yard

129d = 0 10 9
9
4 16 9
5 4½
2 8¼
5 4 9 ¾ ans.

# Case th 6.

To find the value of one hundred weight: As 112 is the groſs, so 112 farthings are 2s 4d and 112 pence 9s 4d. Therefore if the price be farthings, or not more than 3d, multiply 2s 4d by the qrs in the price of 1 L, or if the price be pence, multiply 9s 4d by the pence in the price of 1 lb, and in either case the product will be the answer.

## Examples.

What will 1 Cwt. of Chalk come to, at 1½ per lb?

0 2 4
6
0 . 14 . 0 Price.

6 | 0 " 14 " 0
| 0 " 2 " 4

1 of Tin 2¼

2s 4d
9
9 | 1 . 1 . 0
| 0 . 2 " 4

1 of 2¼ 2 4
10
1 . 3 " 4
1 . 2
10 | 1 . 4 6
| 0 9 . 4

1 — 7 per lb?

9 4
7
7 ) 3 . 5 " 4
0 " 9 . 4

# Case th. 8th.

To find the value of a Cwt. when the price of 1 lb is any is any number of pound or shillings, or shillings pence and farthings: Multiply the price of 1 lb by 7, and the product by 8, and this product by 2, which last product will be the answer requirede.

## Examples.

What will 1 Cwt. of Tobacco cost at 5s 7½ per lb?

0 5 7½
7
£ s
1 " 1 9 " 4½
8
15 " 15 " 0
2
31 " 10 " 0 ans.

7 | 4 10 0
8 | 0 " 11 " 3
2 | 5 " 7 " ½

1 Cwt. 3 10 ½

3 " 10 ½
7
1 " 7 " 1½
8
10 " 17 " 0
2
21 " 14 " 0 ans.

7 | 3 " 2 " 0
8 | 0 " 7 " 8½
2 | 3 " 10 ½

1 Cwt. 16 11 ½

16 " 11½
7
5 " 18 " 8½
8
47 " 9 " 8
2
94 " 19 " 4 ans.

7 | 94 " 19 " 4
8 | 13 " 11 " 4
2 | 1 " 13 " 11
| 0 " 16 " 11½ Proof.

Sat. Sept. 23. 1797

# Duodecimals or Croſs Multiplication.

Is a rule made use of by workmen and artificers in casting up the contents of their works. Dimensions are generally taken in feet, inches and parts. Inches & parts are sometimes called primes, seconds, thirds, &c. and are marked thus; inches or primes (') seconds (") thirds (''') fourths ('''') &c.

Rule. 1st Under the multiplicand write the corresponding denominations of the multiplier. 2d. Multiply each term in the multiplicand, beginning at the lowest, by the highest denomination in the multiplier, and write the result of each under its respective term, observing, in duodecimals to carry an unit for evry 12, from each lower denomination to its next superior, and for other numbers accordingly. 3d In the same manner multiply all the multiplicand by the primes or seconds denomination in the multiplier, and set the result of each term one place removed to the right hand of those in the multiplicand. 4th. Do the same with the seconds in the multiplier, setting the result of each term two places to the right hand of those in the multiplicand. 5. Proceed in like manner with the rest of the denominations, & their sum will be the answer required.

## Examples.

Multiply $2\frac{1}{2}$ by $2\frac{1}{2}$

2 6<br>
2 6<br>
5 0<br>
1 3 0<br>
ans. 6 3

or Thus.

$2\frac{1}{2}$<br>
$2\frac{1}{2}$<br>
ans. $5\,1\frac{1}{4}$

Or Thus.

2, 5<br>
2. 5<br>
1 2 5<br>
5 0<br>
6 2 5 ans.

Multiply 9f. 8' 6" by 7f. 9' 3"

9 8 6<br>
7 9 3<br>
67. 11 6<br>
7 3 4 6<br>
2 5 1 6<br>
ans. 75 5 3 7 6

If two places differ in longitude 2° 12' what is ~~their difference of tim~~

2° 12' 0 0" 00'''<br>
3 59 20<br>
6 36 0 0<br>
2 9 4 0<br>
4 4 0<br>
0 46 32

How many square feet in a board 17 feet 7 Inches and 1 foot 6 inches wide?

```
     17   7
      1   5      The
    ---------
  7  3   11
 17  7
 ----------------   Answer.
 24 10   11
```

How many cubic feet in a stick of timber twelve feet 10 inches long, 1 foot, seven inches wide and 1 foot 9 inches thick?

```
      12  10
       1   7
    ----------
    7   5  10
   12  10
  -------------
   20   3  10
        1   9
    -----------
   15   2  10  6
   20   3  10
  --------------
   35   6   8  6
```

A Sexcedsimal.

Two places differ in longitude 31° 27' 30"; what is the difference, in time, of the sun's coming to the meridian of those places, the sun passing the 15° in an hour.

```
  15°
 ------------
 31° 37' 30"
      4' 00"
 ------------
 26  30  00  00
```

The answer.

How many cubic feet of wood in a load 6 feet 7 long, 3 feet 5 inch high, & 3 fe. 8 in. wide?

```
    6   7
    3   5
  ---------
  19   9
   2   8  11
  -----------
  22   5  11
   3   8
  -----------
  67   6   9
  14  11  11  4
  --------------
  82 : 5 " 8 " 4
```

Answer.

There is a house with four tiers of windows and four windows in a tier; the height of the first tier 6 fe. 8 in. of the second 5 f. 9 of the third 4 f. 6 in. and of the fourth 3 f. 10 and the breadth of each is 3 feet 5 inches how many square feet do they contain?

```
     6 " 8
     5 " 9
     4 " 6
     3 " 10
   ----------
    20 " 9
     3 " 5
    62 " 3
     8 " 7 " 9
   -------------
    70 " 10 " 9
              4
   -------------
   283 " 7 " 0
```

# Single Rule of Three Direct.

The rule of three direct teacheth, by having three numbers given, to find a fourth; that shall have the same proportion to the third, as the second has to the first. If more require more, or leſs require leſs, the question belongs to the rule of three direct. But if more require leſs, or leſs require more, it belongs to the rule of three in verse.

## Rules.

State the question by making that number which asks the question, the third term, or putting it in the third place; that which is of the same name or quality as the demand, the first term; and that which is of the same name or quality with the answer required, the second term. 2. Multiply the second and third numbers together; divide the product by the first and the quotient will be the answer to the question which as also the remainder will be in the same denomination you left the second term in, and which may be brought into any other denomination required.

## Examples.

If 6 lb of sugar cost 9d what will 30 lb cost at the same rate?

6 lb 9 30
9
6 | 270
45d 2 lb 5d. ans.

Again by inverting the order of the question, it will be If 9d buy 6 lb of sugar how much will 2 lb 5d. buy at that rate.

9 6 45
6
9 | 270
30 L. ans.

If my annual income be 109 Guineas, I desire to know what I may spend per day so as to lay up 45 L at the years end?

109
28
872
210
20 | 8052 | 152, 12
20 45
165 5
100
20 | 52 (2
40
12

D £ S D

365 : 107 " 12 :: 1

20

365 | 2152 | 5
1825
327

12

365) 3924 | 10
365
274

4

365) 1096 | 3
1095
1

The ans 5s 10d 3 1/365

Proof 1 D 5s 10d 3 qr 1/365, 365 The ans

12

70 . 10

4

283
365
1416
1698
849
103296
365
516480
619776
309888
37703040

365 | 37703040 | 103296
12 | 365
1203 | 4 | 103296
1095 | 12 | 25824
1080 | | 2152
730

365 | 3504
3285
2190
2190

If my salary be 43£ 12s 5d per annum what does it amount to per week

As 52 : 43 12 5

20

872

12

10469

7

365) 73283 | 200
730 | 12 | 200 | 16 . 8
283 | 12
4 | 80

365 | 1132 | 3
1095
37

ans. 16 8 3/4 365

Proof. 1 D 5s 10 . 3 1/365 :: 365

7 " 16 . 0 . 3 87/365

12

200 . 0

4

803
365
4022
4021
2409
293132
365
1465660
1758792
879396
106993180

365 | 106993180 | 293132
730
3399
3285
1143
1095
481
365
1168
1095
730

7 | 293132 | 41876
28
13
7
61
56
53
49
42

4 | 41876 | 10469
12 | 10469 | 872 1
20 | 872 | £ 43 12 5d

at Sept 30 17[illegible]

If I am to pay 1s 7d per week for pasturing a Cow what am I to give for 37 Cows?

1 : 1 7 : 37
12
19 7
37
133
57
12 | 703
20 | 58 7 | 2 18 7 ans.
12 | 19 | 1 7

How many yards of cloth may be bought 195 D. 75 c. of which 9½ cost 11 D 2 c.?

D C Y D.
11 : 02 9½ 195,75
100 4
1102 38

D
195,75
100
19575
38
156600
58725
1102 | 743850 | 675
6612 | 1683
8265
7714
5510
5510

Proof Yds. D. C. Yds.
168,3 : 195,75 9½
4 100 4
675 :: 19575 : 38
38
156600
58725
675 | 743850 | 11,02
675
688
675
1350
1350

If I buy 57 yds. of cloth for 49 gui. what did it cost per ell english.

57 49 1¼
4 28
228 392
98
1372
5
228 | 6860 | 30 1
684
20
12
228 | 240
228
12
228

Proof.

1 10 1 220 12

20
30
12
361 361
220
2900
122
722

5 | 82320 | 16464
5
32
30
23
20
32
30
20

12 | 16464 | 1372
12
44
36
06
84
24

28 | 1372 | 49
112
252
252

A Merchant failing in trade, owes in all 3475 £ and has in money and effects, but 2316„13„4: Now supposing his effects are delivered up, pray what will each creditor receive on the pound

£ £
3475 :: 2316„ 13„4 : 1
20
46333
12
3475 | 556000 | 160=134
3475
20850
20850

Ans. 160= 13„4

£ Proof.
1 :: 13„4 :: 3475
12 160
160 556000

12 | 556000 | 46333
48
76
72
40
36
40
36
40
36
4

20 | 46333 | 2316„13„4
40
63
60
33
20
133
120
133

What will C. q. lb 3„3„14 of red lead come to if 1lb cost 5½d?

C. Q. lb
1lb 5½d 3„3„14
4 4
22 15
28
434
22
868
868
4 | 9548
12 | 2387
20 | 198=1
9„18=1 ans.

27. Bought a Cask of wine, at 4s 7d per Gallon: for 125 dollars. how much did it contain?

S. D. S. D.
4" 7 :: 1 :: 125 :
12 6
55 750
12
55 | 9000 | 163" 2" 1" 5/55 an.
55
350
330
200
165
35
4
140
110
30
2
55 | 60 | 1
55
5

What come the commiſsions of 785 £ 10 at 3½ G. per cent?

£ G. £
100" 3½" 785
90
6280
7065
100 | 76930
20 | 769" 30
38" 9" 30
12

If 100 £ gain £ 6 in a year, what will £ 475 gain in that time?

£ £ £
As 100 :: 6 :: 475
6
100 | 2850 | 28" 10.
200
850

The earth being 360 degrees in circumference turns round on its axis in 24 hours; how far does it turn in one minute, in the 48 d parallel of lattitude; the degree of longitude in this lattitude, being about 51 statute miles.

H. D. M. M.
24 : 360 × 51 : 1 :
60 360
51
1440 1440 | 18360 | 12" 3/4 ans.
1440
3960
2880
360 | 1080 | 3
1080

Said Harry to Dick, my purse and money are worth 3¼ guineas, but the money is worth eleven times more than the purse; pray how much money is there in it?

As 12 : 1 : 3¼ : 7 7 : 4" 11 – 77
28 77
12 | 91 | 7" 7 4 " 3" 5 — ans.
84
7

A & B set out from the same place and travel the same road; but A goes 5 days before B, at the rate of 20 miles a day; B follows at the rate of 25 miles per day: in what time and distance will he overtake A?

D. m.
1 :: 25 :: 20 Minutes.
25
100
40
1 | 500
20 | 500 | 25
40
100
100

If 50 gallons of water, in one hour, fall into a cistern, containing 230 gallons, & by a pipe in the cistern 35 gal. run out in an hour, in what time will it be filled.

g. h. ditto
15 :: 1 :: 230 ::
15 | 230 | 15 1/3
15
80
75
5

Proof 1 : 30 :: 15 1/3 :: 15
15 1/3
75
15
230 | 230 | 1
230

A Bill of exchange was accepted at Newberry Port for the payment of £345,, 10, for the like value delivered in New York, at 133⅓ New York currency for £100 Massachusetts ditto: how much money was paid in New York, £75 Massachusetts being equal to £100 New York?

£75 :: Ditto 100 :: Ditt. 345,, 10 S.
20 | 20
1500 | 6910
100

1500 | 691000 | 460
60
91
90
10
20
15 | 200 | 13
15
50
45
5
12
15 | 60 | 4 — £ S. d 460,, 13,, 4

Proof

£ 345,, 10 :: ditto 460,, 13,, 4 :: £ 75 ::
20
9213
12
110560
1500
55280000
110560
691,0 | 16584000,0 | 24000
1382
2764
2764
12 | 24000
20 | 2000
100 ans.

Suppose a Bill is drawn in Ireland and payable in Boston, for £678,, 12,, 6. Irish: how much Massachusetts money comes it to, the exchange at 81¼ Irish per £100 Massachusetts?

£ 81¼ :: £ 100 :: £ s 678,, 12,, 6
20 | 20
1625 | 13572
12 | 12
19500 | 162870
100

19500 | 16287000 | 829
156000
56700
39000
177000
175500
1500
20
195000 | 30000 | 1
19500
10500
12
19500 | 126000 | 6
117000
9000
9000 | 19500 | 2
18000
1500
1500 | 9000 | 6
9000
1500 | 19500 | 13
1500
4500
4500

Sold a Cargo of Flaxseed in Ireland for £1795,, 10 s. Irish money; what does that amount to in Massachusetts money, £81,,5, Irish being equal to £100 Massachusetts?

£ 13 :: 1795,, 10 :: 16 ::
20
35910
16
215460
35910
2,0 | 57456,0
28720
13 | 2209 — 13 | 144 | 11
13
14
13
1
11
20
13 | 220 | 16
13
90
89
12
12

# Rule of Three Direct in Vulgar Fractions.

## Rule.

Having made the necessary preparations as directed in multiplication and division of vulgar fractions state your question as in whole numbers, and invert the first term of your proportion; then multiply the three terms continually together, and the product will be the answer. —

If 5/8 of a yard cost 5/7 farth. wh. w. 9/15 ell e.

5/8 : 5/7 : 9/15 : 5/8 of 4/1 of 1/4

5×4×1 / 8×1×5 = 20/40 = 1/2

2×5×9 / 1×7×15 = 90/105 = 17/1/½

```
      90
      20
105 | 1800 | 17/1/½
      105
      750
      735
       15
       12
105) 180
     105
      75
       4
105 | 300 | 1/2
      210
       90
```

If 3/5 of a yard cos 7/8 of £ what will 40½ come to?

3/5 : 7/8 : 40½
2
81 × 7 × 5 / 2 × 8 × 3

81/2 × 7/8 × 5/3 = 40/2835

```
      20
     56700
```

```
      40
40 | 56700 | 70/1/12
     240
     435
     432
       3    20) 1101 | 59/1/3
             12
             12
         40) 144 (3
```

If 70 Bushels of corn cost 12 3/5 what is it per Bushel.

70/1   12 3/5   1

1/7   63/5   1/1

63/350 = 3/3/7/1/5

If 7/16 £51 1/1 3/32:

16 × 51 × 3 / 7 × 1 × 32 = 224/2448

```
224 | 2448 | 10
      224
      208
       20
224) 4160 | 18s.
     224
     1920
     1792
      128
       12
224) 1536 (6 3/4
     1344
      192
        4
224)  768
      672
       96
```

96/224 = 12/28 = 3/7

At 83/8 per Cwt. what will 9 2/3 lb come to

336/8 X 29/8 X 29/3

29
3
87
29
783
174
2523
8064

336
8
2688
3
8064

2523
20
8064 | 50460 | 6„3„5/34
48384
2076
12
8064 | 24912 (3
24192
720 = 60
8064 = 672

60/672 = 5/56

A Person having 4/5 of a vessel, sells 2/3 of his share for £319, what is the whole vessel worth.

2/3 :: 3/638 :: 4/5 = 16/9570

638
3
1914
5
9570 16 | 9570 | 598„2„6.
80
157
144
16) 130
128
2
20
16) 40
32 (2
8
12
16) 96
96 (6

A merchant sold 5 1/2 of cloth each containing 12 2/3 yards, at 9 1/2 per yard, what did the whole amount to?

1 :: 9 1/2 :: 5 1/2 x 12 2/3

1 :: 9 1/2 :: 410/6 209/3
12
108
4
434
1

1/1 X 434/1 X 209/3 = 3/90706

3 | 90706
4 | 30235„1
12 | 7558„3„1
20 | 629„10„3„1
31„9„10„3/4„1/3.

A buys of B 560 3/4 bank stock at 85 2/3 per cent, what comes it to?

1/100 X 257/3 2243/4

2243
257
15701
11215
4486
1200 | 576451 | 480„7„6„1/5
4800
9645
9600
451
20
9020
8400
620
12
7440
7200
240 (1 / 100 | 1/5

Nov 11

A Merchant in Holland draws a Bill upon his Correspondent in Boston for 3750 Ducats at 8„4 1/5 d: How much Massachusetts currency must he receive?

1/1 : 501/5 : 3750/1

3750
501
3750
18750
5) 1878750
12) 375750
20 | 31312„6
1565„12„6.

A Gentleman from Boston being in England, where the price of silver is to that of Gold, as 1 to $15\frac{1}{4}$ exchanged 150 1/4 lb of silver for gold; on his return to Massachusetts, where the price of silver is to that of gold, as 1 to $15\frac{15}{31}$, a friend, wanting his gold, gave him the value thereof in silver; what weight of silver did he gain by the exchange?

As $\frac{1}{1}$ G. : $15\frac{15}{31}$ : $10\frac{1}{2}$

```
  15          10
 155           2
  31          --
 ---          21
 465          --
  15           2
 ---
 480
 ---
  31
```

$\frac{1}{1}$ G. : $\times \frac{480}{31}$ : $\times \frac{21}{2}$

```
     480
      21
    ----
     480
    960
   -----
   10080

 62 | 10080 | 162
      62       36
      ---      --
      388      62
      372
      ---
       160
       124
       ---
        36
```

# The Rule of Three Direct, in Decimals.

## Rule.

Having reduced your fractions to Decimals, and stated your question as in whole numbers, multiply the second and third together, and the quotient will be the answer

If 1 oz of silver cost 6s. 8d. 1 lb: 7 oz 13 G. cost?

```
12 | 1,0000        12 | 8,0000
   | ,083          20 | 6,6666
   the first term.      ,3333
                        2d term.

24 | 13 5
20 | 0,5416
12 | 7,270
   | 1,605
   3d term.
```

,083 : ,3333 :: 1,605

```
        ,3333
        -----
         4815
        4815
       4815
      4815
      -------
,083) ,53494650 ( 6,4451
       498
       ---
        369
        332
        ---
         374
         332
         ---
          420
          415
          ---
            15
            83
           ---
           320
           249
           ---
            71
```

6,44513 = £6. 6. 9

# Continued.

If 9 3/4 cost 3s. 7d. 6 what will 1/2 of a yard come to?

9,75 : 3,59 :: ,5

9,75 ) 1795 ( ,1842
9,75
,8200
,7800
4000
3900
2000
1950
50

,1842
20
3,6840
12
8,2080
4
,8320 — 3s. 8d. answer.

If 1 hhd. sugar, weighing 9 Cwt. 3 qr. 14 lb. cost 27£. 13s. 7, what will 3 C. 1 qr. 17 lb. come to?

9,875 : 27,678 :: 3,401
3,401
27678
110712
83034
9,875 ) 94132,878 ( 9,532
88875
52578
49375
32037
29625
24128
19750
4378

9,532
20
190,640
12
7,680
4
2,720

£1. 10. 7. 2. — Answer.

There is a cistern which has three cocks, the first will empty itself in 1/4 of an hour, the second in 3/4, and the third in 1 1/2; in what time will it be emptied if all three run together?

,25 | 1 / 0,04 ; ,75 | 1 / 0,01,333 ; 1,5 | 1 / 0,666

h. C. h.
,25 : 1 :: 1 : 4
,75 : 1 :: 1 : 1,333
1,5 : 1 :: 1 : 0,666
5,999 = 6

C. h. C.
6 : 1 :: 1 : ,1666 — 10m.

6 | 1, / ,1666

A Conduit has a Cock which running into a Cistern, will fill it in 12 minutes. This cistern has three cocks; the first will empty itself in 1/4 of an hour, the second in 37 1/2 m., and the third in 1/2 of an hour; in what time will they be filled, if all four run together?

h. C. h. C.
,2 : 1 :: 1 : 5
1,25 : 1 :: 1 : 0,8
,625 : 1 :: 1 : 1,6
,5 : 1 :: 1 : 2

C. h. C.
6 : 1 :: 1

6 | 1,000 / 1,66+

h. m.
166 = 1.40

# The Rule of three Inverse,

## or

# Reciprocal Proportion.

## Rule.

State, and reduce the terms, as in the rule of three direct; then multiply the first and second terms together, and divide by the first third; the quotient will be the answer in the same denomination as the middle term was reduced into.

If there be fractions in your question, and if they be vulgar, invert the third term; then multiply the three terms continually together, and the product will be the answer. ....

### Examples.

How much ſhalloon, that is $\frac{3}{4}$ of a yard wide, will line $6\frac{3}{4}$ of cloth which is $1\frac{1}{4}$ of a yard wide?

$1\frac{1}{4} : 6\frac{3}{4} :: \frac{3}{4}$

4   4

5 : 27 : 3

5

3 | 135

4 | 45

$11\frac{1}{4}$ ans.

The same by Vulgar Fractions

$1\frac{1}{4} = \frac{5}{4}$   $6\frac{3}{4} = \frac{27}{4}$   $\frac{3}{4} - \frac{4}{3}$

$\frac{5}{4} : \frac{27}{4} :: \frac{4}{3}$ — $\frac{540}{48} = \frac{45}{4} = 11\frac{1}{4}$

by Decimals.

$1\frac{1}{4} = 1{,}25$   6,75 = 6,75   $\frac{3}{4} = {,}75$

6,75

1,25

3375

1350

675

,75 | 8,4375

11,25

Suppose I lend a Friend 350£ for 5 months he promising the like kindneſs; but when requested, can spare but 125, how long may I keep it to balance the favor. —

£350 : 5 M. :: 125

5

125 | 1750 | 14

125

500

500

000

Suppose 450 men are in a garrison and their proviſions are calculated to last but 5 months; how many must leave the garrison, that the same proviſions may be ſufficient for those who remain 9 months?

Mo. Me. Mo.

5 : 450 :: 9

5

9) 2250 | 250 — 200

18

45

45

0

If a man perform a journey in 15 days, when the day is 12 hours long, in how many will he do it, when the day is but 10 hours long?

h. D.
12 : 15 :: 10
12
10 | 180 | 18
10
80
80

If a piece of land 40 rods in length, and 4 in breadth make an acre, how wide must it be, when it is but 19 rods long, to make an acre?

Le. Br. Le.
40 : 4 :: 19
40
19) 160 | 8, 6, 11 $\frac{7}{19}$ Br. fe. in.
152
6
16½
19 | 132 | 6
114
18
12
19) 216 (11
209
7

How many yards of carpet, 2 $\frac{3}{4}$ f. wide, will cover a floor, which is 18 feet, 16 broad?

f. f.
16 : 18 :: 2 $\frac{3}{4}$
4 64 4
64 72 11
108 3
33
33) 1152 | 34, $\frac{10}{11}$
99
162
132
3) 30 — $\frac{10}{11}$
33

How much in length that is $8\frac{5}{7}$ inches broad, will make a foot square?

in. di.
$\frac{144}{1} \cdot \frac{1}{1} \cdot \frac{61}{5}$
$\frac{144 \times 1 \times 7}{1 \times 1 \times 61} = \frac{1008}{61}$

61) 1008 (16 $\frac{32}{61}$
61
398
366
32

If when wheat is 6s per bushel, the twopenny loaf weigh 9,6 oz. what ought it to weigh, when wheat is 7, 6 d.?

s.
6 : 9,6 oz. 7, 6
12 72 12
72 192 90
672
90 | 691,2 (7,68 = 7, 13, 14, 4 oz. Pe. G.
630
612
540
720
720

768
20
13,60
24
240
120
1440 = 4

A Regiment of Soldiers consisting of 745 men, is to be clothed, each suit containing 3½ yards of cloth, which is 1 $\frac{3}{8}$ of a yard wide, and lined with shalloon $\frac{7}{8}$ of a yard wide; how many yards of shalloon will line them?

$745 \times 3\frac{1}{2} = \frac{5215}{2}$ $1\frac{3}{8} = \frac{11}{8}$

and $\frac{7}{8}$ inverted $= \frac{8}{7}$

Then as $\frac{5215}{2} \times \frac{11}{8} \times \frac{8}{7} = \frac{458920}{112}$

112) 458920 (4097½
448
1092
1008
840
784
56 = ½

If a suit of clothes can be made of 4 $\frac{1}{8}$ yard of cloth, 1 $\frac{3}{8}$ of a yard wide, how many yards of coating $\frac{7}{8}$ of a yard wide will it require for the same person?

$\frac{11}{8} : \frac{33}{8} :: \frac{8}{7}$

2904
448

448) 2904 (6, 1, 3 $\frac{5}{7}$ yd. q. n. ...
2688
216
4
448 | 864 (1
448
416
4
448) 1664 (3
1344
320

320 = 80
448 = 112

$\frac{80}{112} = \frac{20}{28} = \frac{5}{7}$

# Compound Proportion,

or

# Double Rule of Three.

Teaches to resolve such questions, as require two, or simple proportion; and that whether direct or Inverse: It is composed commonly of 5 numbers, to find a sixth, which, if the proportion be direct, must bear such proportion to the 4th and 5th, as the 3d bears to the first and second; but if inverse, the sixth number must bear such proportion to the 4th and 5th, as the 1st bears to the second and third. —

## First Method.

By two or more proportions in the Single rule of Three. —

### Rule.

1st. Let either of the two numbers, of which the raise question is raised, be put in the third place, and the correspondent number, of the same name or kind, in the first; the second will be that, which has no correspondent number given. 2. Three of the five given numbers being thus stated, find a fourth proportionable. 3. Put this fourth number, for the second number of a second stating, the remaining number of which the question is raised, the third, and its correspondent number of the same name, the first; then will the fourth number resulting be the answer. —

If a principle of £100 gain £6 interest in a year, what will a principle of £400 gain in 9 months? Here of the 5 given numbers, £100 principal, £6 interest, and a year or 12 months, are conjoined in form of a supposition, and thereupon a question raised concerning £400 for 9 months; wherefore, let either of the two numbers, £400 or 9 months, be put for the third number of the first stating, and its corresponding term, £100 or 12 months, for the first.

£ : £ :: £
100 : 6 :: 400
6
100 | 2400 ( 24
2400

M. : £ :: M.
12 : 24 :: 9
9
12) 216 ( 18
216

£
100 : 6 :: 400
12 : 6 :: 9
3600
6
12|00 | 216|00 | 18
216

If £100 gain 6 in a year, in what time will 400 gain 18?

M.
100 : 12 :: 6
400 : :: 18

100
12
1200
18
9600
1200
21600

400
6
2400 ( 21600 | 9
21600

Second Method:

Always place the three conditional terms in this order: That number which is the principal cause of gain or loss, the first term; that which denotes the space of time or distance of place; and that which is the gain loss or action the third; If the blank place, or term sought, fall under the third place, then the question is in direct proportion; Therefore, Rule 1st Multiply the three last terms together, for a dividend, and the two first for a divisor: But if the blank fall under the first or second terms; then the proportion is inverse; Therefore, Rule 2d. Multiply the first, second and last terms together for a dividend, and the other two for a divisor, and the quotient will be the answer.

If £400 gain £18, in 9 months; what is the rate per cent, per annum?

400 : 9 :: 18
100 : 12 ::

18
96
12
216
100
21600

400
9
3600 ) 21600 ( £6
21600

If 8 spend £32 in 13 weeks; what will 24 men spend in 52 weeks?

Men.
8 : 13 :: 32
24 : 52 ::

24 × 52 × 32 = 39936
8 × 13 = 104

104 ) 39936 ( 384 an.
312
873
832
416
416
000

If the freight of 9 hhds. of sugar, each weighing 12 Cwt. 20 leagues, cost £16; what must be paid for the freight 50 tierces ditto, each weighing 2½ Cwt 100 leagues?

9
12
108

50
2½
125

hhds. lea. £
108 : 20 :: 16
125 : 100 ::

100
12500
16
75000
12500

108
20
2160

2160 ) 200000 ( 92" 11" 10 2/9 ans.
1944
560
432
128
20
2560
2376
184
12
2208
2160
2 ) 48 ( 2/9
216

There was a certain edifice completed in a year by 20 workmen; but the same being demolished, it is necessary that just such an one should be built in 5 months. I demand the number of men to be employed about it.

M. mo. Q.
20 : 12 :: 1
5 :: 1

20
12
5 ) 240 ( 48 men.

If 6 men build a wall 20 f. l. 6 f. h. & 4 f.t., in 16 days, in what time will 24 men build one 200 f. l. 8 th. 6 f. th.?

m.
6 : 16 :: 20 × 6 × 4 = 921600
24 : :: 200 × 8 × 6 = 11520

11520 ) 921600 ( 80 an.
92160
0

9600
16
57600
9600
153600
6
921600

480
24
1920
960
11520

# Conjoined Proportion.

## Rule.

Place the numbers alternately, that is, the antecedents at the left hand, and the consequents at the right, and let the last number stand on the left hand; then multiply the left hand col umn continually for dividend, and the right for a divisor, and the quotient will be the answer.

## Examples.

Suppose 100 yards of America = 100 of England, and 100 ditto = 50 Canes of Thoulouse; 100 Canes ditto = 160 ells of Geneva, and 100 ells of Geneva = 200 ells of Hamburgh: How many yards of America = 379 ells of Hamburg

| Antecedents | | Consequents |
|---|---|---|
| 100 of Amer. | = | 100 Eng. |
| 100 of En. | = | 50 of Thou. |
| 100 of Tho. | = | 160 Gen. |
| 100 Ge. | = | 200 Ham. |
| 379 of Ham. | | 379 x 5 = 236 7/8 yards of Ame. = 379 ells H. |

### Illustration.

The two 100s on both sides cancel each other. Let the last cyphers of three next antecedents and consequents be cancelled, which is dividing by 10. Then divide the second antecedent and consequent by 5, and the quotients will be 2 on the side of the antecedents, and one on the side of the consequents; Then two will measure the third antecedent, and the quotients will be 5 and 8. 10 will measure the 4th antecedent, and consequent, and the quotients will be 1 and 2. Now there being 2 left on each side, they cancel each other, and as there is no farther room for abridging, by reason of the odd number 379, the operation is finished, and the answer found as before.

If 20 lb at Boston, make 23 at Antwerp, and 155 at Antwerp make 180 at Leghorn, how many at Boston are equal to 144 at Leghorn!

20 at Boston = 23 Ant.
155 at Ant. = 180 Leg.
144

44640

414) 44640 (107 19/23
414
3240
2898
342 = 19/23
414

If 12 lb at Boston make 10 at Amsterdam, if 100 Amsterdam 120 paris, how many lb at Boston will make 80 at paris?

12 = 10
100 = 120
80

1200) 96000 (80
960

If 40 lb at N. Port make 36 at amsterdam, and 90 lb at amsterdam make 116 at Dantzic, how many lb at Newburyport are equal to 260 lb at Dantzic?

40 = 36
90 = 116
260

4176) 936000 (224 4/29
8352

4176
10080
8352
17280
16704
576 = 4/29
4176 =

If 140 braces at Venice is equal 150 at Leghorn, and 47 braces at Leghorn are equal to 4 American yards, how many venetian braces are equal to 52 Am. yards?

140 = 150
47
32

31360
4
600

31360 / 600 = 52 4/15

# Fellowship.

The rules of Fellowship are those by which the accompts of several merchants, or other persons trading in partnerships, are so adjusted, that each may have his share of the gain, or sustain his share of the loss, in proportion to the share of the joint stock; together with the time of its continuance in trade.

## Single Fellowship.

Is when the stocks are employed for any certain equal time.

Rule.

As the whole stock is to the gain or loss, so is each man's particular stock, to his particular share of the gain, or loss. Proof. Add all the particular shares of the gain or loss together, and, if it be right the sum will be equal to the whole gain or loss.

A B, and C companied; A put 145; B, 219; C, 378; D, 417, with which they gained 569: what was the share of each?

145 + 219 + 378 + 417 : = 1159 : 569 gain:

1159 : 569 :: 145
145
1845
2276
569
1159 ) 82505 ( 71
8113
1375
1159
216
20
1159 ) 4320 ( 3
3477
843
12
1159 ) 10116 ( 8
9272
844
4
1159 ) 3376 ( 2
2318
1058

1159 : 569 :: 219
219
5121
569
1138
1159 ) 124611 ( 107,, 10,, 3 3/4 375/1159
1159
8711
8113
598
20
1159 ) 11960 ( 10
11590
370
12
1159 ) 4440 ( 3
3477
963
4
1159 ) 3852 ( 3/4
3477
375
1159

1159 : 569 :: 378
378
4552
3983
1707
1159 | 215082 | 185
1159
9918
9272
6462
5795
667
20
1159 | 13340 | 11,
12749
591
12
1159 | 7092 | 6
6954
138
4
552

1159 : 569 :: 417
417
3983
569
2276
1159 | 237273 | 204
2318
5473
4636
837
20
1159 | 16740 | 14
1159
5150
4636
514
12
1159 | 6168 | $6\frac{1}{4}$
5795
373
4
1159 | 1492 | 1
1159
333

A B, and C, are concerned in a joint stock of £168„ 2„ 6. of which A's part is 25„ 10, B's, 37„ 15. C's 49, and D's, £55„ 17„ 6. Upon the adjustments of their accompts, they have lost £. 73„ 3. 13„ 4. What was the loss of each?

£168„ 2„ 6 :: £73„ 13„ 4 :: 25„ 10
20 | 20 | 20
3362 | 1473 | 510
12 | 12 | 12
40350 | 17680 | 6120
6120
353600
17680
10660
40350 | 108201600 | 2681
80700 | $11„ 3„ 5\frac{1}{2}$
275016
242100
329160
322800
63600
40350
23250
4
40350 | 93000 | 2
80700
12300

40350 : 17680 :: 37„ 15 red. to D. is 9060
9060
1060800
159120
40350 | 160180800 | 3969
121050
391300
363150
281580
242100
394800
363150
31650
4
40350 | 126600 | 3
121050
5550

# Continued.

40350 : 17680 :: 55„17„6
20
1117
12
13410

13410
176800
70720
53040
17680

40350 ) 2370888800 ( 5875
201750
353388
322800
305880
282450
234300
201750
32550
4

40350 | 130200 | 3
121050
9150

24„9„7 3/4

£ 49„0
20
980
12
11760

40350 : 17680 :: 11760
1060800
123760
17680
17680

40350 ) 207916 6600 | 5152
201750
61668
40350
213180
201750
114300
80700
33600
4

40350 ) 134400 | 3
121050
13330

21„9„4 3/4

A Gentleman died leaving three sons and a daughter; in the following manner he bequeathed his estate to them: To the eldest son he gave 312 Moidores, to 2d he gave 312 Guineas, to the 3d 312 pistoles, & to the daughter 312 dollars; But when his debts were paid, there were but 312 half joes left; what must each have in proportion to the legacies that had been bequeathed them?

The 312 moidores, the 312 Guineas, the 312 pistoles, and the 312 dollars must all be brought into shillings, which after they are added together, are equal to 28704 in shillings, for the first term.

The 312 half joes must be brought into shillings likewise for the second term, which are equal to 14976, 312 moidores only, reduced to shillings, is the third term. After all this is done, you proceed with the sum the same as with any other, only that the answer will be in shillings and you must divide by 20, which will give you the answer in Pounds.

28704 : 14976 : 312 pis.
6864

28704 | 102795264
179„1„2 1/2 : 3d son.

312 m.
36
11232

28704 : 14976 :: 11232

28704 | 168210432
£ 93„0„2 1st Son.

312 d.
6

28704 : 14976 : 1872
1872
28035072
D. Da. £ 48„16„8 1/4

G. 312
28

28704 : 14976 ::
8736
130830336
£ 227„17„10 3/4 — 2d Son

# (2) Double Fellowship.

## Rule.

Multiply each man's stock or share by the time it was continued in trade; Then, As the whole sum of the products, is to the whole gain, or loss, so is each man's particular product, to his particular share of the gain or loss.

---

A, B, and C, hold a pasture in common, for which they pay £40 per annum. A put in 9 oxen for 5 weeks; B, 12 Oxen for 7 weeks; C, 8 oxen for 16 weeks, what must each pay of the rent?

9 × 5 = 45; 12 × 7 = 84; 16 × 8 = 128

128 + 84 + 45 = 257 : 40 :: 45

257 : 40 : 45
45
200
160
257) 1800 (7,, 0,, 0,, 3
1799
1
20
257) 20 (0
12
257) 240 (0
4
960 (3
960
771
189

257 : 40 :: 84.
84
160
320
257) 3360 (13
257
790
771
19
20
257) 380 (1
257

123
4
1476
1285
191
4
764
514
250

257 :: 40 :: 128
128
320
80
40
257) 5120 (19
257
2550
2313
237
20
4740 (18
257
2170
2056
114
12
1368 (5
1285

83
4
257) 332 (1
257
75

Four Merchants traded in company; A put in £100 for 5 months; B, £150 for 7 months; C, 220 for 8 months; D, 310 for 9 months; But by misfortunes at sea they lost £145. What must each man sustain of the loss?

6100 : 145 :: 500
500
6100) 72500 (11,, 17,, 8 1/2
6100
11500
6100
5400
20
108000 (17
6100
47000
42700
4300
12
6100) 51600 (8
48800
2800
4

6100) 11200 (1/2
6100
5100

6100 : 145 :: 1050
1050
7250
1450
6100 | 152250 | 24" 19" 2" 40/61
12200
30250
24400
5850
20
6100 | 117000
6100
56000
54900
1100
12
6100 | 13200 | 2
12200
1000
4
4000
61000 £4" 16" 8" 1/2" 58/61

6100 : 145 :: 1760
1760
255200
24400
11200
6100
5100
20
6100 | 102000
6100
41000
36600
4400
12
6100 | 52800
48800
4000
4
6100 | 16000
12200
3800
6100

6100 : 2790
145
13950
11160
2790
6100 | 404550
36600
6100 | 38550
36600
1950
20
39000
36600
2400
12
6100 | 28800
24400
4400
4
17600
12200
5400
66" 6" 4 1/2

A with a capital of £100 began trade the 1st of January 1787, and meeting with success in his business, he took in B the first of March following, with a capital of £150. Three months after, they admitted C, who brought into stock 180: and after trading together until the first of January 1788, they found there had been gained since A's commencing business 173" 13. How must this be divided among them.

£3960 : £177" 13 :: £1200
20
3553
1200
3960 | 4263600 | 1076
3960
30360
27720
26400
23760
2640
12
3960 | 31680
31680
00000
1076" 8 =
£53" 16" 8
A's share.

3960 : 3553 :: 1500
1500
1776500
3553
396 | 5329500 | 1345
396
1369
1188
1815
1584
2310
1980
330
12
396 | 3960 | 10
3960
0000
B's share. 1345" 10 =
67" 5" 10.

3960 : 3553 :: 1260
1260
213180
7106
3553
3960 | 4476780 | 1130
3960
5167
3960
12078
11880
1980
12
3960 | 23760 | 6
23760
00000
1130" 6 =
56" 10" 6. C's share.

# Practice.

Is A Contraction of the Rule of three direct, when the first term happens to be an Unit, or one; and has its name from daily use among Merchants, and Tradesmen, being an easy and concise method of working most questions which occur in trade and business.

The method of Proof is by the Rule of Three Direct. Com. Mul. or varying the order of them.

## Case 1st.

When the price of 1 yd. lb. &c. is an even part of a shilling; Find the value of the given quantity at 1d per yd. lb. &c. then draw a line underneath, and divide it by the even part, and the quotient will be the answer in shillings, which must always be brought into pounds.

What will 354½ yds. cost, at ¼ per yard?

¼ = 1/48 — 354„6 the value of 354½, at 1d per yd.

48 | 354„6

£0„7„4½ value of 354½ yds. at ¼ per yd.

What will 759¾ come to, at 3d per yd.

3d = ¼ | 759¾ — 189„11¼

2|0 | 18|9„11¼

£ 9„9„11¼

The Value of the above.

## Case 2d.

When the price is pence and no even part of a shilling; Find the value of the given quantity at 1d a yd; Divide the pence into aliquot parts; for divisors; and the sum of the quotients arising from them, will be the answer.

What will 487½ yds. come to, at 5d per yd?

| | | |
|---|---|---|
| 3 | ¼ | 2|4„7„6. |
| 1 | 1 | 6„1„10½ |
| | 4 | 4„1„3d |

The Value. 10„3„1½

Divided by 2.0

2.4„7„6.

What 568¼ come to, at 7d per yard?

20 | 568¼

£2„8„8„3

The value at 7d per yd.

4 3 | 1/3 | 28„8„3.

1/4 | 9„9„5

7„2„0

£16„11„5¾

What is the value of 912½ yds. at 9d?

| | | |
|---|---|---|
| 20 | 912½ | 45„12„6 |
| 1/2 | 45„12„6 | |
| 1/4 | 22„16„3 | |
| | 11„8„1¼ | |
| | 34„4„4½ | |

yd. 1 : 9 :: 912½

9

12 | 8212½

684„4½

34„4„4½

Proof.

# CONTINUED

## Case 3d.

When the price is pence or farthings, and an even part of a pound, cut off the right hand figure of the given quantity, and the cypher, in the aliquot part, if it has one, and divide by the remaining figure. When you come to the remaining, double it, and divide as before. The answer will be pounds, shillings, &c. If there be no cypher in the divisor, then none should be taken from the dividend.

What will 3795 yds come to, at ¼ per yd?

960 = 8 × 12 | 379 | 5
31„12„6
3„19„0 ¾
The Value of the above.

¾ · 1 · 320 · C × 4 | 3795
47„8„9
11„17„2 ¼
The Value of the above.

1 = 1/240 = 4 × 6 | 3795
63„5
15„16„3

12 | 3795
20 | 316„3
Pr. 15„16„3

## Case 4th

When the price is between 1 and 2 shillings; Find the value of the quantity at 1s per yd. which value being divided by those even parts which the pence are of 1s, and the quotients arising therefrom, added thereto, the sum will be the answer required.

What will 758 ½ yds cost at 1„9.

6 | ½ | 758 ½
3 | ¼ | 37„18„6
18„19„3
9„9„7 ½
66„7„4 ½

20 | 847 (½ at 1„1d
1/12 | 42„7„6
3„10„7 ½
45„18„1 ½
The Value.

9d 1 : 13 :: 847 ½
13
20 | 1101 7
12 | 45„18 7 ½
Pr.

## Case 5th.

When the price wants an even part of two shillings; number of sh. under 40; First find multiply the given quantity by half the price, and double the first figure of the product for s. The rest of the product will be £. N. B. If the price be 2s, you need only double the unit figure for shillings. The other figures will be £.

What will 746 yds cost at 2s per yd.
74„12. ans.
answer

12.9 ½ 2d at 4s.
12.9 ½
2
£ 25„18„0

917 ¼ at 10.
5
458 6 ¼ =
458„12„6.

1 : 10 :: 917 ¼
10
20 | 9172 ½
458„12„6
Pr

# Caſe 6.

When the price wants an even part of two shillings; First find the value of the whole quantity, at 2s per yd. then divide by that even part which is wanting, and subtract this quotient from the value at 2s. The remainder will be the answer.

What will 95½ yds cost, at 22d. per yd?

95½
2
20 | 191
12 | 9,,11,,0 | 0,,15,,11
0,,15,,11
£8,,15,,1

64 yds at 23d.

64
2
128
£6,,8
£0,,5,,4
£6,,2,,8

375¼ at 20d.

375¼
2
4 | 750½
37,,10,,6.
6,,5,,1
£31,,5,,5.

1 : 20 :: 375¼
20
7505
625,,5
31,,5,,5.
Proof.

# Case 7th.

When the price is between 2 and 3 shillings. First, find the value of the quantity at 2s per yd. which value being divided by those even parts, which the pence are of two shillings, & those quotients added thereto, the sum will be the answer.

What will 148½ yds cost at 2,,4 per yd?

4 | 1/6
3 | 1/8
2s | 148½
2
297
14,,17,,0
2,,9,,6
1,,17,,1½
19,,3,,7½

266¼ yds, at 2,,1, per yd?

266¼
2
532½
26,,12,,6
1,,2,,2¼
27,,14,,8¼
The Value.

543½ yds, at 2,,2 per yd?

543½
2
1087
54,,7
4,,10,,7
58,,17,,7

Monday

1 : 26 :: 543½
26
14131
117,,7
58,,17,,7
Proof.

# Case 8th.

When there are pence in the price, which are an even part of a shilling, besides an even number of shillings under 20; First find the value of the quantity, at the shillings per yard &c. according to Case 5th; then suppose the quantity to stand as shillings per yds; divide it by that even part, which the pence are of 1s and this quotient being added to the value before found, the sum will be the answer.

156½ at 6,,4
3
469
3 | 156½ | 46,,19,,0
52,,2 | 2,,12,,2
49,,11,,2

17½ 4s ½
2
35 | 2 | 17½
3,,10,,0 | 8¾
3,,10,,8¾

68¼ 8,,1
4
273 — 27,,6,,8¼
5
27,,11,,8¼

97
68¼
662 0¼
55 1,,8¼
27,,11,,8¼

# Concluded.

## Case 23th.

When the price wants an even part of a pound; First, find the value of the given quantity at at £1 per yd; then divide it by that even part which is wanting, and subtract this quotient therefrom; the remainder will be the answer.

What will 167 ½ yds cost at 17„6 per yd?

| | | | |
|---|---|---|---|
| 2„6 | 1/8 | £167„10 | Value at £1 per yd |
| | | 20„18„9 | Ditto at 2„6 per yd. |

£146„11„3. Answer.

What will 34 7/12 cost at 13„4 per yd.

34 7„10„6
115„16„8

231„13„4.

What will 485 ¼ cost at 15„0 per yd?

4 | 485„15
121„8„9

364„6„3

614 at 16
£614
192„4

491„4„0

1:16„:614
16
3684
614
9824

## Case 24th.

When the price of Cwt. is of several denominations, and the quantity likewise; Multiply the price by the integers, and take parts for the rest from the price of an integer, which added together, will be the answer.

What will 9„3„14 lb of sugar come to at £4„17„4 per Cwt?

| | | | |
|---|---|---|---|
| | | | 4„17„4 |
| 2 0 | ½ | | 9 |
| 1 0 | ½ | | 43„16„0 |
| 0 14 | ⅛ | | 2„8„8 |
| | | | 1„4„4 |
| | | | 0„12„2 |
| | | | 48„1„2 |

What will 12„1„24 come to at 3„18„10 per Cwt?

3„18„10
12

| | |
|---|---|
| ¼ | 47„6„0 |
| 1/7 | 0„19„8-2 |
| ½ | 0„11„3-1 |
| | 0„5„7-1 |

The Ans. 49„2„7 ¼

# Tare and Tret.

Tare and Tret are practical rules for deducting certain allowances, which are made by merchants in selling their goods by weight. Tare is an allowance made to the buyer, for the weight of the box, barrel, or bag which contains the goods bought, and is either at so much per box, at so much per Cwt. or at so much per groſs weight. Tret is an allowance of 4th in every 104, for waste, dust, &c. Cloff is an allowance of ℔ 2 upon every 3 cwt. Groſs weight is the whole weight of any sort of goods, together with the box, barrel, or bag in which it is contained. Suttle is when part of the allowance is deducted from the groſs. Neat weight is what remains after allowances are made.

## Case 1st.

When the tare is so much per box, barrel, or bag; — Multiply the number of boxes, barrels &c. by the tare and subtract the product from the groſs, and the remainder will be the neat weight required. —

In 6 hhd. of sugar, each weighing 9 Cwt. 2 ℔ 10 groſs, tare 25 per hhd. how much neat weight?

25 × 6 = 1 Cwt. 1 10

9 2 10
6
57 2 4
1 1 10
56 0 22 The Answer.
Neat Weight.

In 5 bags of Cotton marked with the groſs weight as follows, tare ℔ 23 per bag.

A = 7 1 19℔
B = 3 3 27
C = 5 1 12
D = 6 0 15
E = 8 1 0
31 0 17
1 0 3
30 0 14

What is the neat weight of 15 hhds of Tobacco, each 7 1 18? Tare ℔ 100 per hhd.?

tare 23 × 5 = 1 0 3

6.7 1 18 reduced to pounds = 825
15
4125
825
12375
4127
110 1 27

Tare 1500 = 13 1 ℔

110 1 27
13 1 16
97 0 11

## Case 2.

When the tare is so much per Cwt.; Divide the groſs weight by the aliquot parts of a C. subtract the quotient from the groſs, and the remainder will be the neat weight.

In 129 Cwt. 3 16 groſs, tare 14 per Cwt, how much neat?

| 14 | 1/8 | 129 3 16 |
|---|---|---|
| | | 16 0 26½ |
| | | 113 2 17½ |

In 97 C. 1 7 groſs, tare 20 per C. What neat weight?

| 20 | 1/7, 1/4 | 97 1 7 |
|---|---|---|
| | | 13 3 17 |
| | | 3 1 25 |
| | | 17 1 14 |

97 1 7
17 1 14
79 3 21

Monday the first of Jan.
New Years Day
1798

# Case 3d.

When tret is allowed with tare. Divide the suttle weight by 26, and the quotient will be the tret, which subtract from the suttle, and the remainder will be the answer.

## Examples

In 247 C. 2. 15 lb gross, tare 28 per Cwt. and tret 4 upon 104. what neat weight?

lb C. gr. lb

| | | |
|---|---|---|
| 28 | 1/4 | 247 2 15 |
| | | 61 3 17 |
| 4 | 1/26 | 185 2 25 4 |
| | | 7 0 16 0 |
| | | 178 2 9 4 Neat. |

What is the neat weight of 4 hhds. of Tobacco, weighing as follows, the first 5 c. 1. 12 lb tare 65 per hhd. the 2d, 3. 0. 19 lb. gross, tare 75 lb; the 3d; 6. 3. 0 gross, tare 49 lb, and the 4th, 4. 2. 9 lb gross, tare 35 lb, allowing tret to each as usual

| | | |
|---|---|---|
| 5 1 12 | 65 | 19 3 12 |
| 3 0 19 | 75 | 2 |
| 6 3 0 | 49 | 17 3 12 |
| 4 2 9 | 35 | 0 2 20 |
| Cwt. 19 3 12 | 224 | 17 0 19 |

# Case 4th.

When tare, tret and cloff are allowed, Deduct the tare and tret as before, and divide the suttle by 168, and the quotient will be the cloff, which subtract from the suttle, and the remainder will be the answer.

## Examples.

What is the neat weight of 1 hhd. of Tobacco, weighing 16 Cwt. 2 20 lb gross, tare 14 lb per Cwt. tret 4 upon 104, and cloff 2 lb upon 3 Cwt.

| | | |
|---|---|---|
| 14 | 1/8 | 16 2 20 0 gross. |
| | | 2 0 9 8 tare, sub. |
| 4 | 1/26 | 14 2 10 8 |
| | | 0 2 6 13 tret, sub. |
| | | 14 0 3 11 suttle |
| 2 | 1/168 | 0 0 9 5 cloff, sub. |
| | | 13 3 22 6 |
| | | N. Weight. |

If 9 hhds of Tobacco, contain 85 Cwt. 0 2, tare 30 lb per hhd. tret & cloff as usual, what will be the Neat weight at 6½ per lb, after deducting for duties £ 51 11 8d?

| | |
|---|---|
| 85 0 2 | 78 3 25 brought into lb |
| 2 Th. tare 2 1 16 | 8845 Mult by 26 = |
| 82 2 14 | 229970 |
| 3 0 19 | 57492 2 |
| 79 1 21 | 4791 2 |
| 0 1 24 | 239 11 2 |
| 78 3 25 | 51 11 8 |
| Neat weight. | £ 187 19 6 |

# Simple Interest.

Interest is a premium allowed by the borrower of any sum of money to the lender, according to a certain rate per cent. agreed on, which by law is stated at 6l. that is, £6 for the use of 100. for 1 year, &c.

Principal is the money lent. Rate is the sum per cent, agreed on.

Amount is the principal and interest added together.

Interest is of two sorts, simple, and compound.

Simple Interest is that, which is allowed for the principal lent only.

Note. The Rules for Simple Interest serve also to calculate commission, brokerage, insurance, purchasing stocks, or any thing else rated at so much percent.

# General Rule.

Multiply the principal by the rate, and divide by 100 the product; or which is the same, cut of the two right hand figures in the pounds, which must be reduced to the lowest denomination, each time cutting off as at first, and the quotient will be the answer for one year. 2∂ For more years than one, multiply the interest of one year by the given number of years, and the product will be the answer for that time. 3∂ If there be parts of a year, as Months, or days, work for the Months by the aliquot parts of a year, and for the Days by the Rule of Three Direct, or which is sufficiently exact for common use, allowing 30 days to the Month, take aliquot parts of the same.

| Note when the rate per cent per annum is | £ | Multiply the principal by | |
|---|---|---|---|
| | 9 | | $\frac{3}{4}$ |
| | 8 | | $\frac{2}{3}$ |
| | 6 | | $\frac{1}{2}$ |
| | 4 | | $\frac{1}{3}$ |
| | 3 | | $\frac{1}{4}$ |
| | 2 | | $\frac{1}{6}$ |

What is the interest of 573,, 13,, 9½ for 1 year, at 6l percent. per annum?

573,, 13,, 9½
6
34|2,, 2,, 9
20
8|42,, 15,, 0
12
5|13
4
52
342,, 9 answer

What is the interest of £439,, 12,, 9½. at 6l per cent. per annum?

439,, 12,, 9½
8 = one half the number of months.
35|17,, 2,, 4
20
3|142,, 7,, 6
12
5|08,, 10,, 0

# Continued. S. I.

What is the interest of 51l. 15„4d. for 1 Month at 6l. per cent per annum?

51l. 15„4
6
310„6„12„0
20
132„0„0
12
384„
4
336

12 | 31„1„3¾
2„11„9¼

Of 45l. 12„8½ for 2 Months, at 6l. per cent per annum?

45l. 12„8½
6
27l. 5„16„3
20
9 | 16„5„0
12
195„0„0
4
380„0„0

6 | 2l. 0„1¾
7„11„6¼

£508„10„5½ for 5 Months, at 6 per c. per annum?

6
3051„2„9
20
10 | 22„15„0
12
273„10„0
4
292„0„0

3 | 30„10„2½
10„3„5
2„10„10
12„14„3

6 = ½ | 43„3„11½
21„11„11¾

Of 719„4. for 6 months, at £6 per cent per annum?

£719„19„4
6
4319„16„0
20
396„0„0
12
1152„0„0
4
400„0„0

£517„11„11½ (S. D.) for 8 Months, at £6 per cent. per annum?

£517„11„11½
6
£3105„11„9
20
£111„15„0
12
£141„0„0
4
£164„0„0
£31„1„1¼
£20„14„0¾

Of 245„5„0¾ for 9 months at 6l. per cent per annum?

245„5„0¾
6
£1471„11„4½
20
£14 347„6
12
4 1210„0
4
50„0„0
£14„14„4
7„7„2
3„13„7

£11„0„9
Answer.

# Continued

Of 148,,12,,6½ for 11 months at 6 per cent per annum?

£ 148,,12,,6½
6
£ 891,,15,,3
20
S. 1835,,5,,0
12
D. 423,,0,,0
4
Q. 92,,0,,0

£ 8,,0,,4
4,,4,,2
2,,4,,1
1,,9,,8¾
£ 8,,3,,5¾

Of 443,,10,,3 for 15 mo. at 8 per cent per annum?

£ 443,,10,,3
8
3548,,2,,0
221,,15,,1½
3326,,6,,11
20
526,,18,,4
12
321,,0,,0 £ 33,,5,,3.

£ 517,,12,,8½ for 5 years 11 Mo. and 25 days, at 6 per centum per annum?

Multiply 517,,12,,8½ by 6 years, By the Rule of Three direct find what the interest of the above is for 5 days, which subtract from the product, multiplied by 6, and the Remainder will be the answer.

# Simple Interest.
## In
# Federal Money.

## Problem 4th.

When the principal is Federal Money, and Interest is required in the same. Rule. Work according to the general Rule, in Simple Interest, that is, multiply by the rate of Interest, separate the two right hand figures of the dollars in the product; and it will give the interest, in Dollars, Cents &c. N.B. The Figures that are more than three places to the right hand of the comma, are of no account.

What is the annual Interest of 537,,24,,6. at 6 per cent?

6
3223476
is equal to
D. 32,,23,,4 Mills

What is the interest D. of 1465,,46,,6. for 16 M. at 6 per cent per annum?

D. 1465,,46,,6
8
11723728
D. 117,,23,,7 M.

Of 537,,34,,7 for 19 d. Interest as usual?

537,,34,,7
9.5
268673 5
4836723
51,047905
D. 51,04,,7.

# Simple Interest.

## By Decimals.

### Rule.

Perhaps the most convenient way to calculate at 6 per cent. is first to do it 5, and then add $\frac{1}{5}$ of the quotient to itself; because, by cutting off the two cyphers in the divisor, you have to divide only by 73. Hence when interest is to be calculated on cash accounts, or any other accounts, where partial payments are made, or partial debts are contracted; multiply the several balances, into the days they are at interest, and the sum of these products, divided as above, will give the interest at 5 or 6, per cent. and for any other rate, make the proper addition or deduction; or find a divisor as before directed.

## Examples.

On the first of January I lent £450, 10, 6. which I received back in the following partial payments, Viz. on the 14 of January £57, 11, 9. on the 7th. of February, £39, 3, 10.; on the 19th. of March, £63, 5, 2.; on the 4th of April, £45,; on the 25th of April £19, 12, 6.; on the 12th. of May, £100.; on the 10th of June; £60, 7, 3.; and on the 1st of August; £65, 10.; what Interest is due at 6 per cent?

Lent on dem. £450, 10, 6.
Rec. in part 57, 11, 9
Balance. 392, 10, 9
39
£ 353, 14, 11 × 40 = 9430, 10, 0
63, 5, 2 1414 9, 16, 0
£ 290, 9, 9 × 10 = 4647, 16, 0
45, 0, 0
£ 245, 9, 9 × 22 = 5400, 14, 6
19, 12, 6
£ 225, 17, 3 × 16 = 3613, 16,
100, 0, 0
£ 125, 17, 3 × 29 = 3650, 0, 3
60, 7, 3
£ 65, 10, 0 × 52 = 3406, 0, 0

450, 10, 6
13
5836, 16, 6
£ 392, 10, 9
24
9430, 10, 0

5836, 16, 6
9430, 10, 0
1414 9, 16, 0
4647, 16, 0
5400, 14, 6
3613, 16, 0
3650, 0, 3
3406, 0, 0
50155, 9, 11
Divided by 73.
by the rules of division of decimals, gives the answer
Interest at 5 per cent.
6, 17, 4 ¾
1, 7, 5 ¾ 1 year in.
£ 8, 4, 10 ½

# Discount,

an allowance made for the payment of any sum of money, before it becomes due, and is the difference between that sum, due some time hence, and its present worth. The present worth of any sum, or debt, due some time hence, is such a sum, as if put to Interest, would in that time, and at the rate per cent. for which the discount is to be made, amount to the sum, or debt then due.

## Rule 1st.

As the amount of 100l. is to 100 for the given rate and time, So is the given sum or debt to the present worth. Subtract the present worth from the given sum, and the remainder will be the discount required. Or, as the amount of 100l., for the given rate and time, is to the interest of 100l. for that time: So is the given sum or debt to the discount required.

## Examples.

What is the discount of 635„17. due two years hence, at 5½ per cent per annum? =

5 10
2 years.
11
Add 100
111 : 11 :: 635„17
20
12717
11
S. 222{0) 13988{7
1332
668
666
27
20
222{0) 540{0
12
222{0) 648{0 (2
444
204
£63„0„2¾

£4 30„2 = 1„15„10½

What is the discount on 97„10. due January 22d, this being the 7 of Sepr interest at 5l. per c. per a.

£ 101„17„6 : 1„17„6 :: 97„10
20 20 20
2037 37 1950
12 12 12
24450 450 23400
450
1170000
9360
D. 2445{0) 105300{0 (430,
9780
7500
7335
1650
4
D. 2445) 6600 (2
4890
1710
2445

# Continued.

What is the present worth of £275, payable as follows; viz. ½ at 3 months, ⅓ at 6 months, and the rest at 9 months, supposing the discount to be made at 6l. per cent per annum?

If 101„10 : 1„10 :: ½ = 137„10

20 — 2030 ; 20 — 30 ; 20 — 2750

30 — 8250:0 (40„7½ — 203:0

812 — 130 — 12 — 1560 — 1421 — 139 — 4 — 556 — 406 — 150

£ 103 : 3 : 9 :: 1„ 13„ 4 ::: 104„10 : 4„10 :: 45„16„8

20 — 1833 — 12 — 22000 — 3 — 66000 (247½ — 4944 — 1650 — 20 — 33120 — 2472 — 8400 — 7416 — 984 — 12 — 11808 — 9888 — 1920 — 4 — 7680 — 7416 — 264

20 — 2090 — 12 — 25080 ; 20 — 90 ; 20 — 900 — 12 — 10800 — 90 — 972000

2„13„4¾

25080 ) 979200 (39 — 7524 — 22680 — 22572 — 108 — 12 — 1296 — 4 — 5184 — 5016 — 168

£1„19„0½

£ 2„ 0„ 7½
£ 2„ 13„ 4¾
£ 1„ 19„ 0½
£ 6„ 13„ 0¾ subtr. f. Prin. is eq. to

£268„6„11¼

Bought a quantity of goods for £250 ready money, and sold them for £300 payable 9 months hence: What was the gain, in ready money, supposing discount to be made at 6l. per cent per annum?

As £104„10 : 4„10 :: 300

20 — 2090 ; 20 — 90 ; 20 — 6000 — 90

D. 209|0 ) 540000|0 — 418 — 1220 — 1045 — 1750 — 1672 — 78 — 12 — 936 — 836 — 100

100 — 4 — 209 ) 400 (½ — 209 — 91

258„4½ =
£12„18„4½

£ 300„0„0
12„18„4½
287„1„7½
250„0„0
£ 37„1„7½